ADDISONIA

COLORED ILLUSTRATIONS

AND

POPULAR DESCRIPTIONS

OF

PLANTS

VOLUME 3
1918

PUBLISHED BY
THE NEW YORK BOTANICAL GARDEN
(ADDISON BROWN FUND)

PRESS OF
THE NEW ERA PRINTING COMPANY
LANCASTER, PA.

CONTENTS

Part 1

MARCH 30, 1918

Part 2

JUNE 29, 1918

Part 3

SEPTEMBER 30, 1918

Part 4

DECEMBER 31, 1918

ADDISONIA

COLORED ILLUSTRATIONS
AND
POPULAR DESCRIPTIONS
OF
PLANTS

VOLUME 3 NUMBER 1

MARCH, 1918

PUBLISHED BY
THE NEW YORK BOTANICAL GARDEN
(ADDISON BROWN FUND)
MARCH 30, 1918

ANNOUNCEMENT

A bequest made to the New York Botanical Garden by its late President, Judge Addison Brown, established the

ADDISON BROWN FUND

"the income and accumulations from which shall be applied to the founding and publication, as soon as practicable, and to the maintenance (aided by subscriptions therefor), of a high-class magazine bearing my name, devoted exclusively to the illustration by colored plates of the plants of the United States and its territorial possessions, and of other plants flowering in said Garden or its conservatories; with suitable descriptions in popular language, and any desirable notes and synonomy, and a brief statement of the known properties and uses of the plants illustrated."

The preparation and publication of the work have been referred to Dr. John H. Barnhart, Bibliographer, and Mr. George V. Nash, Head Gardener.

ADDISONIA is published as a quarterly magazine, in March, June, September, and December. Each part consists of ten colored plates with accompanying letterpress. The subscription price is $10 annually, four parts constituting a volume. The parts will not be sold separately.

Address:

THE NEW YORK BOTANICAL GARDEN
BRONX PARK
NEW YORK CITY

Subscribers are advised to bind each volume of ADDISONIA as completed, in order to avoid possible loss or misplacement of the parts; nearly the whole remainder of the edition of Volumes 1 and 2 has been made up into complete volumes, and but few separate parts can be supplied. *New subscriptions will be accepted only as including the first volumes.*

ARONIA ATROPURPUREA

(Plate 81)

ARONIA ATROPURPUREA

Purple-fruited Choke-berry

Native of eastern North America

Family MALACEAE — APPLE Family

Aronia atropurpurea Britton, Manual 517. 1901.
Pyrus arbutifolia atropurpurea Robinson, Rhodora **10**: 33. 1908.
Pyrus atropurpurea L. H. Bailey, Rhodora **18**: 154, 1916.

An irregularly branching shrub, reaching a maximum height of about twelve feet, usually lower, commonly about seven feet high. The young twigs are slender; the bark of old stems is smooth and dark grey. The winter-buds are narrow, sharp-pointed, and about one quarter of an inch long. The leaves unfold in early spring and fall in late autumn; the blades are oval to obovate, from one inch to three inches long, about one inch wide or less, pinnately veined, finely and rather sharply toothed, moderately thin in texture; the apex is either acute or blunt, the base narrowed, and the petiole is much shorter than the blade, seldom over one quarter of an inch in length; the upper surface of the blade is dull green and smooth or nearly so, the midvein bearing small glands; the lower surface is persistently whitish-woolly; the small, narrow stipules fall away very soon after the leaves unfold. The flowers are borne in terminal, more or less compound, woolly cymes, and open, according to latitude, in April, May, or June, soon after the leaves unfold; their pedicels are short and woolly. The small, urn-shaped, woolly calyx has five acute lobes which are glandless or bear a few glands; there are five, obovate, obtuse, concave, spreading white petals one sixth to one quarter of an inch long. The numerous stamens are much shorter than the petals, with filiform filaments and very small anthers.

This shrub inhabits wet woods and thickets in eastern North America, ranging from eastern Canada to Ontario, Michigan, and southward to Virginia, perhaps to Florida. It grows readily when planted in dry ground, even with full exposure to the sun, but does not become as tall under these conditions as when in its more natural habitat of wet thickets; it is attractive and interesting both in flower and in fruit.

The genus *Aronia*, established by Medicus in 1789 (Phil. Bot. 140), is composed of but three species, all natives of eastern North America and closely related to each other. The typical species is *Aronia arbutifolia*, the red choke-berry, which, like *A. atropurpurea*, has woolly under leaf-surfaces, but its fruit is bright red and only about a quarter of an inch in diameter, and its flowers have very

glandular calyx-lobes; with us, the red choke-berry does not succeed well in cultivation in the open, seldom becoming over four feet high, and not appearing anything like as vigorous as *A. atropurpurea* when growing alongside of it; the red fruits persist on the shrub well into the winter. The third species, *Aronia melanocarpa*, the black choke-berry, differs from both the others in having glabrous leaves, twigs, and cymes, and its black or nearly black fruit, a quarter to a third of an inch in diameter, falls in the autumn; its stems and branches are nearly straight and upright.

The foregoing observations upon these shrubs have been made from plants in the fruticetum of the New York Botanical Garden. The plants from which our illustrations were obtained were grown from seed collected on Staten Island, New York, in 1896, near the type locality at Tottenville.

N. L. BRITTON.

EXPLANATION OF PLATE. Fig. 1.—Fruiting branch. Fig. 2.—Flowering branch.

ASTER NOVAE-ANGLIAE

(Plate 82)

ASTER NOVAE-ANGLIAE

New England Aster

Native of the eastern and middle United States and Canada

Family CARDUACEAE THISTLE Family

Aster Novae-Angliae L. Sp. Pl. 875. 1753.

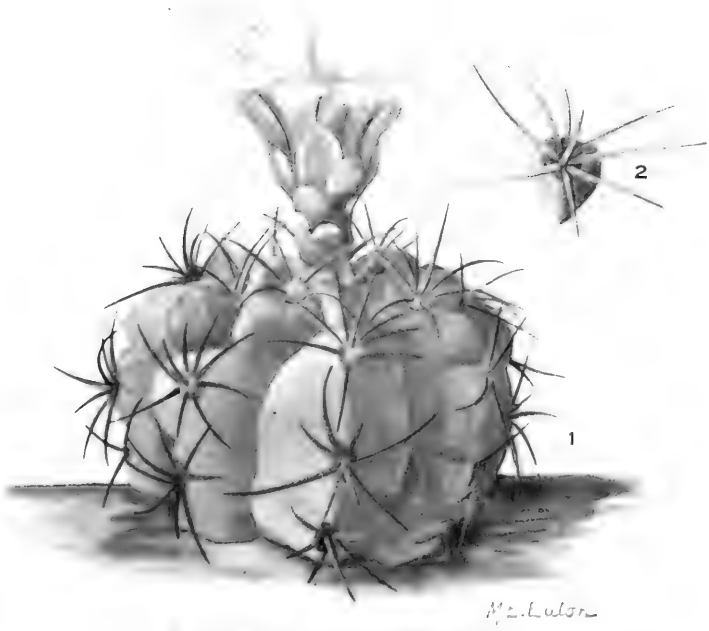
A stout, tall, large representative of the genus, sometimes growing to a height of six or eight feet. The stiff robust stems are rough-hispid, more or less corymbosely branched above and conspicuously leafy throughout. The rough-pubescent leaves are entire-margined, up to five inches long and an inch wide, lanceolate-cordate in shape, and clasp the stem and branches with their cordate or auriculate bases. The flower-heads are clustered at the ends of the branches. The involucre is green, pubescent, and more or less glandular and viscid. The rays, forty to fifty in each flower-head, are a half to nearly three quarters of an inch long, normally purple or violet-colored, rarely pink, red, or white.

This is one of the commonest of the two hundred and fifty or more recognized species of the genus *Aster*, of which about one hundred and fifty are native to North America. Its range may be roughly designated as within the region lying south from Quebec and Saskatchewan, east from Colorado, and north from Alabama and South Carolina. It grows in both dry and wet locations, and is usually a conspicuous floral feature of late summer and early autumn, especially along roadsides, fences, and borders of woods. For interior decorative purposes it is disappointing, as, unlike most of the blue and purple asters, it is sensitive to handling and wilts very quickly. Except for the red and white color-forms, the species does not vary from the normal type, and there is no difficulty in recognizing it, and no possibility of confusing it with any other.

ARTHUR HOLLICK.

EXPLANATION OF PLATE. Fig. 1.—Flowering stem. Fig. 2.—Involucre, × 2.

A. GYMNOCALYCIUM MULTIFLORUM



B. GYMNOCALYCIUM MOSTII

(Plate 83)

A. GYMNOCALYCIUM MULTIFLORUM

Many-flowered Gymnocalycium

Native of Argentina

Family CACTACEAE CACTUS Family

Echinocactus multiflorus Hook. Bot. Mag. *pl. 4181.* 1846.
Gymnocalycium multiflorum Britton & Rose.

Plants solitary or growing in clumps up to 10 individuals, each one and one half to five inches in diameter, usually globose but sometimes depressed or short-cylindric. The ribs are ten to fifteen, broad and rounded, with low tubercles, each with a small chin below its spine-cluster; the areoles are only a few to each rib, elliptic, sometimes two fifths of an inch long; the spines are five to ten in a cluster, all radial, yellow, sometimes brownish or reddish at base, subulate, spreading, often recurved, the longest sometimes over an inch long. The flower-bud is ovoid, and covered with imbricate scales; the expanded flowers are short-campanulate, pinkish to nearly white; the scales on the calyx-tube are broad, rounded, naked in their axils. The stamens and style are included; the stigma-lobes are white, linear.

The plant here illustrated is a small specimen received from the Berlin botanical garden in 1901, which flowered in the New York Botanical Garden, June 1, 1913. The cluster of spines is from a specimen collected by J. N. Rose in Argentina in 1915. The species has been reported from Brazil and other South American countries, but is doubtless restricted to northern central Argentina, where the writer collected it on the high grassy plains of Cordoba in 1915.

J. N. ROSE.

EXPLANATION OF PLATE. Fig. 1.—Flowering plant. Fig. 2.—Portion of a rib, showing an areole and a cluster of spines.

B. GYMNOCALYCIUM MOSTII

Most's Gymnocalycium

Native of Argentina

Family CACTACEAE CACTUS Family

Echinocactus Mostii Gürke, Monatsschr. Kakteenk. **16**: 11. 1906.
Gymnocalycium Mostii Britton & Rose.

Plants solitary, one and one half to three inches high, five inches or less in diameter. The ribs are nine to fourteen, broad and obtuse;

the tubercles are rounded, with a small sharp chin below the spine-cluster; the small areoles are circular; the brownish spines are slender and subulate, the seven to nine radial ones spreading, the central one solitary. The flowers are central, bell-shaped, about three inches long, pale red to pinkish white; the scales on the calyx-tube are few.

The plant here illustrated is a small one collected by J. N. Rose at Cassaffousth, Cordoba, Argentina, in 1915, which flowered in the New York Botanical Garden, June 16, 1917. Its native habitat is on dry hills under low bushes.

The genus *Gymnocalycium*, to which the two species here illustrated belong, appeared first in the catalogue of A. Schelhase's garden at Kassel in 1843, but was not formally published until 1845 when Pfeiffer referred to it three species; the following year he illustrated one of these. Although Dr. Ludwig Pfeiffer was the most distinguished cactologist of his time, this genus has heretofore not been accepted, nor have the species of which it is composed ever been brought together even as a sub-genus. Schumann has treated the species known to him in his subtribe *Notocactus*, but in this tribe he has included other species which are not closely related to *Gymnocalycium*. The genus has no close relatives in South America, being very unlike *Malacocarpus* and *Discocarpus* of that region. In its flowers it resembles some of the Mexican species referred to *Echinocactus*, but is very unlike the true species of that genus.

The species of *Gymnocalycium* are among the most satisfactory cacti for greenhouse cultivation, for they grow well under glass and frequently flower. They are day bloomers and the flowers last for several days. The genus contains about twenty-three species, and is confined to southern South America east of the Andes. Bolivia, Paraguay, and Uruguay, have each two or three species, the remainder being found in the plains and mountain valleys of Argentina. Most of them are small, usually simple plants, but sometimes they are cespitose, with few broad somewhat tubercled ribs. The flowers are central or rarely lateral, with a more or less definite tube, bearing a few scattered broad scales, and these always naked in their axils; the seeds are dome-shaped and tuberculate.

J. N. ROSE.

EXPLANATION OF PLATE. Fig. 1.—Flowering plant. Fig. 2.—Portion of a rib, showing an areole and a cluster of spines.

EUONYMUS ALATA

(Plate 84)

EUONYMUS ALATA

Winged Euonymus

Native of eastern temperate Asia

Family CELASTRACEAE STAFF-TREE Family

?*Celastrus striatus* Thunb. Fl. Jap. 98. 1784.
Celastrus alatus Thunb. Fl. Jap. 98. 1784.
Euonymus Thunbergiana Blume, Bijd. Fl. Ned. Ind. 1147. 1826.
Euonymus alata Thunb.; Regel, Mém. Acad. St.-Pétersb. VII. 4[4]: 42. 1861.

A handsome shrub, dense in habit and freely branching, with attractive foliage, turning rich crimson in autumn, and with numerous flowers in the summer, followed in the fall by a profusion of bright red fruits which persist for a long time. The branches are ascending, with four prominent corky dark-colored wings, which are especially conspicuous during the winter when the foliage is gone. At flowering time the glabrous growths of the year rarely have these wings, but they are usually developed with the maturing of the fruit. The leaves are opposite, on stalks an eighth of an inch long or less, elliptic to obovate, abruptly acuminate, glabrous, a little paler beneath; they measure an inch to two inches long and up to an inch wide, and their margins are rather closely and finely serrate. The flowers, the general appearance of which is a yellowish-green, are from one third to one half an inch in diameter, and are borne, usually in threes, in axillary cymes; the parts are in fours. The sepals are very short, much broader than long. The petals are orbicular or nearly so, an eighth of an inch long or a little more, obtuse or sometimes rather apiculate; their margins are entire or somewhat crenulate. The stamens are very short, inserted on a disk. The style is very short. The purplish capsule is often of a single carpel, or sometimes of two to four carpels, in which case one or more are commonly abortive; the dehiscing carpel discloses a bright orange-red aril which encloses a brown seed, or rarely two seeds.

This, one of the best of all our decorative shrubs, grows native in Japan, Manchuria, the Amur region, and in north and central China. It is one of the shrubs easy to grow, accommodating itself readily to its surroundings, and is a thing of beauty in summer and winter. Its crisp fresh foliage gives it a dainty appearance in the month of May, when its flowers usually appear. As the season advances the leaves become of a grayer hue, and in the autumn turn to a rich crimson, which, with the bright orange-red of the exposed arils, makes it one of the most conspicuous shrubs of that season. As the leaves fall the bright red fruit appears even more conspicuous, and the

corky wings, of a brown color, become more evident, adding a curious as well as attractive touch not seen in other shrubs. It may be rea dily propagated from seeds. The illustration was prepared from a bush which has been in the collections of the New York Botanical Garden since 1905.

The genus *Euonymus* contains about one hundred and twenty known species, distributed in the northern hemisphere, mainly in the central and eastern portions of Asia, with a few in southern Asia and Australia; in the United States there are but five or six species.

GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1.—Fruiting branch. Fig. 2.—Seed, × 2. Fig. 3.—Part of a flowering branch. Fig. 4.—Flower, × 4.

DIOSPYROS VIRGINIANA

(Plate 85)

DIOSPYROS VIRGINIANA

Persimmon

Native of the eastern United States

Family EBENACEAE — EBONY Family

Diospyros virginiana L. Sp. Pl. 1057. 1753.
Diospyros concolor Moench, Meth. 470. 1791.
Diospyros pubescens Pursh, Fl. Am. Sept. 265. 1814.

A small or large tree, or sometimes a shrub, with spreading gray branches, the twigs reddish-brown and glabrous or sometimes obscurely pubescent. The bark of the trunk is deep brown or nearly black and ultimately broken into small blocks. The sap-wood is close-grained, hard, heavy; the heart-wood develops only when the tree is of great age and is dark brown or nearly black. The leaves are alternate, deciduous, short-petioled, with elliptic or oval, varying to ovate, thin, leathery blades, two to six inches long, acute or short-acuminate, entire, shining and deep-green above, paler and dull beneath, glabrous or sometimes finely pubescent, especially beneath, acute, obtuse, or cordate at the base. The flowers are usually staminate or pistillate, solitary or few together in cymes, short-stalked. The calyx is four-lobed, that of the staminate flower with lanceolate to deltoid lobes; that of the pistillate flower is much larger, persistent, accrescent, with orbicular-deltoid lobes. The corolla is white or pinkish, or sometimes greenish yellow, urceolate, about twice as long as the calyx, that of the pistillate flower larger than that of the staminate, with four reniform recurved lobes. The stamens, usually sixteen, are included, and commonly borne in two rows on the lower part of the corolla-tube; their filaments are very short and each one supports an erect narrow elongate anther, the anthers of the inner row usually bearded at the base, those of the outer row slightly larger than those of the inner; the stamens in the pistillate flower are represented by staminodia with short stalks and lanceolate-sagittate bodies. The ovary is sessile, depressed-globose, glabrous and surmounted by four slender styles, each of which is terminated by an inconspicuous stigma. The berries are usually solitary, globose, varying to depressed or elongate, thin-skinned, pale yellow to orange or often reddish brown southward, seated on the accrescent calyx, the diameter of which is usually less than the diameter of the berry; the flesh, hard and exceedingly astringent when green, is soft and yellowish and very sweet when mature. The seeds are flat, elliptic or slightly narrowed upward, arranged in a whorl around the axis of the berry, brown, usually shining, but slightly roughened.

The geographic range of the persimmon in North America extends naturally from Connecticut to Iowa and southward to the Gulf of

Mexico. The plant thrives equally well from near sea level to several thousand feet altitude, and grows both on dry hillsides and in swamps. However, it prefers moderately moist soil, growing both in woods and in the open, where, especially in old fields, it often forms thickets as a result of its stoloniferous habit. The persimmon grows naturally in the vicinity of the New York Botanical Garden. The accompanying illustration was made from trees planted in the Garden.

The common persimmon, also known popularly as date-plum, possum-wood, and 'simmon, has some relatives in the West Indies, but the genus is most abundantly developed in Asia, where the heartwood of several species furnishes the well-known ebony of commerce.

The history of the persimmon begins in the earlier part of the century following the discovery of the New World, and the tree was introduced into European gardens in the earlier part of the seventeenth century, if not previous to it. It was apparently first mentioned in print about the middle of the sixteenth century in an account of De Soto's expedition in Florida, and after that there appeared numerous descriptions of the persimmon in European literature.

On account of its beauty and adaptability to various soils, and also because of its resistance to disease and immunity from disfiguring insects, the persimmon is a tree desirable for ornament. The deep-green glossy leaves make it conspicuous in the summer, while the orange-colored fruits, especially at the north, add much color in the fall.

The early Spanish expeditioners in Florida became acquainted with the persimmon through the Indians, who used both the fresh and dried fruits as food. Since then it has remained a source of food for both the white man and the negro, and its deserved popularity has carried it into proverbs and poetry.

The bark and the wood are useful as well as the fruits. The latter are well known on account of the tannin they contain when green. At maturity this disappears, and so much sugar develops that the fruits decay very slowly, if at all. They sometimes hang on the trees all through the winter; thus partly dried, when foods are scarce, they constitute a temptation and a decoy for various wild animals when man is in search of animal food or "sport." Man and also domestic animals are fond of the fruits; but the natural supply is not conserved as it should be, nor is the tree cultivated to the extent its ornamental and economic possibilities demand. JOHN K. SMALL.

EXPLANATION OF PLATE. Fig. 1.—Fruiting branch. Fig. 2.—Seed. Fig. 3.—Staminate flowers. Fig. 4.—Portion of staminate flower, showing stamens, × 3. Fig. 5.—Pistillate flower. Fig. 6.—Portion of pistillate flower, showing pistil and rudimentary stamen, × 3.

LEPADENA MARGINATAM

(Plate 86)

LEPADENA MARGINATA

Snow-on-the-mountain

Native of the central and western United States

Family EUPHORBIACEAE SPURGE Family

Euphorbia marginata Pursh, Fl. Am. Sept. 607. 1814.
Euphorbia leucoloma Raf. Atl. Jour. 177. 1833.
Lepadena leucoloma Raf. Fl. Tell. **4**: 114. 1838.
Dichrophyllum marginatum Klotzsch & Garćke, Monatsber. Akad. Berlin **1859**: 249. 1859.
Lepadena marginata Nieuwl. Am. Midland Nat. **2**: 300. 1912.

An annual herb, one to three feet high, with a milky, acrid juice. The stems are erect, green, hairy, and branched above to form a three-rayed, dichotomous umbel. The leaves are various, sessile, glabrous, ovate or oblong, and entire, except for an occasional lobing of the lower ones. The lower stem-leaves are alternate and scattered, green or somewhat variegated, one to four inches long and about an inch wide, and are usually subtended by narrow, deciduous stipules. A whorl of three or more leaves subtends the inflorescence, and many showy bract-like leaves, bluish-green with wide margins of white, subtend the flower-clusters. On slender hairy peduncles are the campanulate involucres, which are hairy without and within; these have five fimbriate, inconspicuous lobes, attached alternately with which are the glands, usually five in number; these are green, concave, peltate, an eighth of an inch in diameter, and have white, petal-like reniform appendages about twice their size. The true flowers, enclosed by the involucre, are a single exserted pistillate one with a three-lobed, three-celled ovary on a long stalk, and three styles, each with two recurved stigmas; this surrounded by numerous staminate flowers with short filaments and yellowish anthers. The calyces are very much reduced. The three-lobed capsules are pilose, one fourth of an inch in diameter; the three carpels separate elastically from a persistent axis, each carpel containing a roundish, pitted, gray seed.

This spurge was first described by Pursh in 1814, from a specimen in the herbarium of Captain M. Lewis, which had been collected near the Yellowstone River on July 28, 1806, during the return trip of the Lewis and Clarke Expedition. *Euphorbia marginata* was one of the hundred or more plants described by Pursh from Captain Lewis' collection. Rafinesque, in his Flora Telluriana (1838) gave the name *Lepadena* to his older *Euphorbia leucoloma*, and in 1859 our species was designated *Dichrophyllum marginatum* by Klotzsch and Garcke,

both new generic names resulting from the splitting up of the large genus *Euphorbia*.

Soon after its discovery this plant was introduced to cultivation in England. Our illustration was made from a specimen from the flower borders of the New York Botanical Garden. The snow-on-the-mountain is a common garden annual, grown for its showy white-margined upper leaves. The flowers are inconspicuous, but interesting in structure. A related annual flower of our gardens is *Poinsettia heterophylla*, with red color on the upper leaves. This is sometimes called in contrast "fire-on-the-mountain."

It is a hardy annual, the self-sown seeds germinating the following spring. It may also be propagated readily by seeds, sown in the spring under glass or in the open ground.

KENNETH R. BOYNTON.

EXPLANATION OF PLATE. Fig. 1.—Flowering stem. Fig. 2.—Involucre, × 4. Fig. 3.—Fruit, × 3. Fig. 4.—Seed, × 3.

MAACKIA AMURENSIS BUERGERI

(Plate 87)

MAACKIA AMURENSIS BUERGERI

Japanese Yellow-wood

Native of Japan

Family FABACEAE PEA Family

Buergeria floribunda Miq. Ann. Mus. Bot. Lugd. **3**: 53. 1867.
Cladrastis amurensis Buergeri Maxim. Bull. Acad. St.-Pétersb. **18**: 400. 1873.
Maackia amurensis Buergeri Schneid. Ill. Handb. Laubh. **2**: 16. 1907.

This, a small tree, attains a height of twenty feet or more, with its branches ascending and the white flowers in dense clusters. The growths of the year are densely pubescent, later becoming glabrous. The compound leaves are usually six inches to a foot long, alternate, unequally pinnate, the rachis pubescent. The opposite leaflets, commonly nine to thirteen and on villous stalks less than an eighth of an inch long, have elliptic, oval, or ovate blades which are rounded at the base and obtuse or acute at the apex, and are placed usually at a right angle to the rachis; they have the upper surface glabrous and dark green, the lower paler and densely appressed-pubescent. The inflorescence is composed of three to five spreading or ascending racemes arranged in a terminal panicle up to eight inches long; the axes of the racemes and of the panicle are pubescent with short brown hairs. The flowers, on spreading pedicels a quarter inch long or less and covered with short brown hairs, are three eighths to a half inch long. The broadly bell-shaped calyx is about an eighth of an inch long, has a manifest dorsal swelling, and is appressed-pubescent with short golden-brown hairs; its teeth are very short. The petals are three eighths of an inch long or a little more; the standard has a long claw, the orbicular-obovate blade strongly recurved and emarginate at the apex; the keel and wings have manifest stalks, the blades lobed at the base, the keel folded, hood-shaped at the apex. The stamens are ten, somewhat united at the base, curved at the apex. The ovary is pubescent and bears a short glabrous style. The brown flat pods are one and a half to three inches long and from a quarter to three eighths of an inch wide, with commonly three to five seeds, rarely fewer.

When in flower an attractive and decorative tree, the blossoms occurring in great profusion. It is entirely hardy in the latitude of New York and would be an addition to any collection of trees and shrubs. In the arboretum of the New York Botanical Garden there are two forms of this Japanese yellow-wood; one of these comes into bloom in July or early August, the other bears its flowers about a month later, at a time when the fruit of the former is well on its way

to maturity. It is from this late-flowering form that the illustration has been prepared. Propagation is effected by means of seeds, sown in the spring, or by root-grafting.

The genus *Maackia*, the representative in eastern Asia of *Cladrastis* in the eastern part of the United States, contains two or three species. *Maackia amurensis* is a native of Manchuria, and differs from this in having the leaves glabrous. The variety *Buergeri*, possibly specifically distinct, is confined to Japan. Another Japanese species is the shrubby *Maackia Tashiroi*.

GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1.—Flowering branch. Fig. 2.—Flower, × 2. Fig. 3.—Flower, calyx removed, × 2. Fig. 4.—Flower, the calyx, wings, and keel removed, × 2. Fig. 5.—Keel, × 2. Fig. 6—Wing, × 2. Fig. 7.—Pod.

HIBISCUS OCULIROSEUS

(Plate 88)

HIBISCUS OCULIROSEUS

Crimson-eye Rose Mallow

Native of the eastern United States, especially New Jersey

Family MALVACEAE MALLOW Family

Hibiscus oculiroseus Britton, Jour. N. Y. Bot. Gard. **4**: 220. 1903.

A perennial herb usually five or six feet tall, with numerous cane-like stems. The leaves are ovate or ovate-lanceolate, obtuse or slightly cordate at the base, acuminate at the apex, palmately veined, dentate or slightly crenate, densely but finely white stellate-pubescent beneath, and green and slightly pubescent above. The blades of the largest leaves attain as much as seven inches in length and are somewhat three-lobed. The flowers are conspicuous, often with a spread of six inches, and clustered on branches arising from several of the upper nodes of the several main stems. The petioles and peduncles are often adnate to each other. The corolla-lobes are pale sea-foam yellow, almost white, with an eye of a Tyrian rose color which is a rather intense shade of red. The calyx-lobes are triangular-lanceolate; the bractlets are linear, shorter than the calyx and somewhat spreading. The stamens are of unequal length, those near the base of the column being shorter than those above. The pollen is white with a faint suggestion of sea-foam yellow. The style-branches are spreading, but not strongly recurving, and only slightly expanding into stigmatic surfaces. The mature capsule is ovoid-conic, long-pointed, and five-valved. The seeds are reniform and glabrous.

Two living plants of this species were obtained at Absecon, New Jersey, by William F. Bassett, a nurseryman of Hammonton, New Jersey, about the year 1880. In Mr. Bassett's words, "a great many thousands" of plants descended from these two plants were raised from seed and sold to the trade under the popular name of "crimson-eyed mallow," with the designation of *Hibiscus Moscheutos* var. *albus*. A single plant from this source was obtained by the New York Botanical Garden in the year 1896. In 1903, Dr. N. L. Britton recognized several striking diagnostic characters and gave it the specific rank noted above.

Pedigreed cultures have been grown at the New York Botanical Garden for several generations of descent from the type plant. Some lines of descent have bred remarkably true; others have shown a tendency to vary, giving decreased intensity of color in the eye area and developing diffuse pale pink colors in the blades.

This species crosses readily with different forms and varieties of *Hibiscus Moscheutos*. The second generation of such hybrids breaks up into almost every conceivable grade of variation in regard to eye and blade colorations and to characters of stigmas, stamens, and pods. Duplicates of many if not all grades of these hybrids may be found growing wild, which contribute much to confusion in the identification of the species.

The writer has found plants, agreeing with the type of the species, growing as far north as Rockaway Beach, Long Island. Plants that appear to conform closely to type were found to be abundant along the Tuckahoe River and Cedar Creek near their junction: here pure stands of the plants in number were found growing over an area of considerable size. The geographic distribution of this species is not fully determined at the present time, but it is clearly much more limited in range than is the principal form of *Hibiscus Moscheutos*.

Besides being cultivated rather extensively for their horticultural value, plants of this species have been utilized in hybridization with others by various horticultural firms in the production of novelties.

A. B. STOUT.

EXPLANATION OF PLATE. Fig. 1.—Flowering stem. Fig. 2.—Fruit. Fig. 3.—Seed, × 3.

CORNUS OFFICINALIS

(Plate 89)

CORNUS OFFICINALIS

Japanese Early Dogwood

Native of Japan

Family CORNACEAE DOGWOOD Family

Cornus officinalis Sieb. & Zucc. Fl. Jap. **1**: 100. 1838.

A shrub or small tree up to fifteen feet tall, of rather dense habit, with ascending branches, and yellow flowers, preceding the leaves, in clusters terminating the branchlets. The opposite leaves, with petioles a half inch long or less, have the blades elliptic to ovate, rounded or acute at the base, acuminate at the apex, rather dark green and glabrous above, paler and appressed-pubescent beneath; they measure two to three inches long and three quarters to one and a half inches wide, and have five or six curved nerves on each side, the axils of which, on the lower surface, are furnished with dense masses of golden-brown hairs. The yellow flowers are in clusters of usually twenty or more; they are subtended by yellowish bracts marked with brown, appressed-pubescent, and shorter than the hairy pedicels. The flower-parts are in fours; the calyx is appressed-pubescent, the four lobes very short; the petals are reflexed, ovate-lanceolate, acute, about three sixteenths of an inch long. The four stamens are shorter than the petals. The style is slender and about as long as the stamens. The fruit is scarlet, oblong, about a half inch long and with a diameter a little more than half the length.

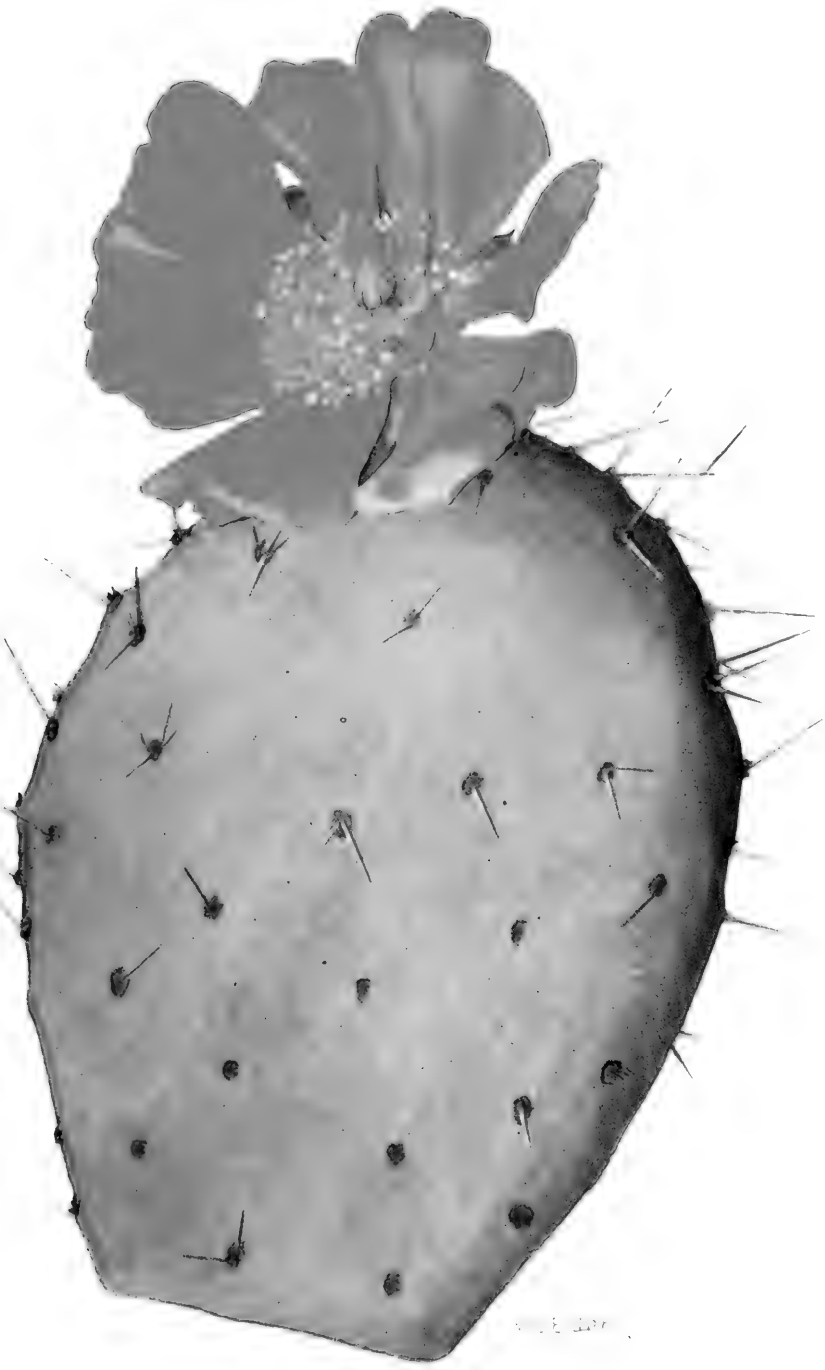
This, a native of the mountainous regions of Japan, is closely related to another species, of southeastern Europe and the Orient, *Cornus Mas*, known as the Cornelian cherry. The Japanese species may be readily distinguished by the dense tufts of brown hairs in the axils of the lower surface of the leaves. *Cornus officinalis*, as it occurs in the collections of the New York Botanical Garden, compared with *Cornus Mas*, is a denser more symmetric shrub or small tree and produces flowers much more freely, features which make it more valuable as a decorative plant. The flowers appear usually early in April, before the leaves, the fruit ripening in the early fall. The specimen, now in the fruticetum, from which the illustration was prepared has been in the collections of the New York Botanical Garden since 1900. This species may be propagated from seeds, which usually germinate the second year after sowing, or by grafting.

In the temperate regions of the northern hemisphere the genus *Cornus* is found rather widely distributed; there is one species known from Peru. Restricted to those forms which have no involucre, or

only a small one, there are about thirty-five known species. Related genera are *Benthamia* and *Cynoxylon*, both with large showy involucres, the former an Asiatic genus of a single species, illustrated at plate 43 of this work, the latter of two species, both natives of the United States. These genera are by some considered a part of *Cornus*.

GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1.—Flowering branch. Fig. 2.—Flower, × 4. Fig. 3.—Fruiting branch. Fig. 4.—Leaf, showing masses of brown hairs in the axils of the lower surface.



OPUNTIA LASIACANTHA

(Plate 90)

OPUNTIA LASIACANTHA

Slender White-spined Prickly Pear

Native of central and southern Mexico

Family CACTACEAE Cactus Family

Opuntia lasiacantha Pfeiffer, Enum. Cact. 160. 1837.
Opuntia megacantha lasiacantha Berger, Bot. Jahrb. **36**: 453. 1905.
?*Opuntia chaetocarpa* Griffiths, Proc. Biol. Soc. Wash. **27**: 25. 1914.

A large and much-branched cactus, six feet high or higher, the lower, trunk-like part sometimes becoming eight inches thick. The joints are flat, dull-green, about a foot long or less, often eight inches wide, and scarcely half an inch thick; the areoles are small and circular, mostly an inch or more apart; the leaves are minute, reddish, awl-shaped, and fall away early. There are from one to four needle-like spines at most of the younger areoles, which diverge from the joints at rather wide angles; the spines are white, with somewhat brown or blackish tips, and they are about two inches long or less, one of them usually much longer than the others; old areoles develop more numerous spines, sometimes as many as fifteen, and they fade grey; the glochids are yellowish to brown and form a tuft at the upper part of each areole, just above the spines, when young about one eighth of an inch long, but twice that length when old. The flowers appear singly at areoles on the edges of the joints near the top; the ovary is obovoid, nearly one inch long, and rather more than half an inch thick; the sepals are about half an inch long, ovate and pointed; the spreading petals are about fifteen in number and from one inch to one and a half inches in length, obovate, variously pointed, rounded or notched at the apex, and narrowed or wedge-shaped at the base; in color they are described as yellow or orange on different plants, in this color-difference agreeing with several other species of *Opuntia;* the numerous yellow stamens are less than half as long as the petals; the style is pink and the stigma-lobes green. The fruit is a globose-obovoid, red berry, nearly two inches long, with a deeply sunken top, its areoles bearing a tuft of short glochids and an occasional bristle.

This cactus appears to have a wide range in the dry parts of central and southern Mexico; it is a member of the group of white-spined prickly pears (tunas) yielding edible fruits which are important as food in Mexico and are exported; the fruit of *O. lasiacantha* is, however, not of the best quality. Many races of this group of prickly pears are cultivated for their fruits and have thus been crudely selected; their botanical classification is very difficult and it is perhaps impossible to define accurately the really wild species.

As understood by me, *Opuntia lasiacantha* has its closest relative in *Opuntia megacantha*, also native of Mexico, which differs from it in having larger joints, longer and stouter spines, and larger fruit; perhaps these differences are neither constant enough nor sufficient to constitute specific distinctness.

The plant from which our illustration was painted was collected by J. N. Rose in 1906, near the City of Mexico; it has flowered frequently at the New York Botanical Garden, and cuttings from it have yielded several large specimens.

N. L. BRITTON.

CONTENTS OF VOLUME I

CONTENTS OF VOLUME II

CONTENTS

ADDISONIA

COLORED ILLUSTRATIONS
AND
POPULAR DESCRIPTIONS
OF
PLANTS

VOLUME 3 NUMBER 2

JUNE, 1918

PUBLISHED BY
THE NEW YORK BOTANICAL GARDEN
(ADDISON BROWN FUND)
JUNE 29, 1918

ANNOUNCEMENT

A bequest made to the New York Botanical Garden by its late President, Judge Addison Brown, established the

ADDISON BROWN FUND

"the income and accumulations from which shall be applied to the founding and publication, as soon as practicable, and to the maintenance (aided by subscriptions therefor), of a high-class magazine bearing my name, devoted exclusively to the illustration by colored plates of the plants of the United States and its territorial possessions, and of other plants flowering in said Garden or its conservatories; with suitable descriptions in popular language, and any desirable notes and synonomy, and a brief statement of the known properties and uses of the plants illustrated."

The preparation and publication of the work have been referred to Dr. John H. Barnhart, Bibliographer, and Mr. George V. Nash, Head Gardener.

ADDISONIA is published as a quarterly magazine, in March, June, September, and December. Each part consists of ten colored plates with accompanying letterpress. The subscription price is $10 annually, four parts constituting a volume. The parts will not be sold separately.

Address:

THE NEW YORK BOTANICAL GARDEN
BRONX PARK
NEW YORK CITY

Subscribers are advised to bind each volume of ADDISONIA as completed, in order to avoid possible loss or misplacement of the parts; nearly the whole remainder of the edition of Volumes 1 and 2 has been made up into complete volumes, and but few separate parts can be supplied. *New subscriptions will be accepted only as including the first volumes.*

COTONEASTER SIMONSII

(Plate 91)

COTONEASTER SIMONSII

Simons' Cotoneaster

Native of the temperate Himalayan Region

Family POMACEAE APPLE Family

Cotoneaster Simonsii Baker, in Saund. Ref. Bot. *pl. 55.* 1869.

A shrub of rather open habit, with spreading branches, roundish leaves, white flowers marked with bright rose, and bright red fruit. The older branches are of a dark purple or purplish gray, and rather sparingly pubescent; the pubescent new growths are usually of a yellowish brown. The leaves, in clusters of two to four on short lateral branches, are broadly oval to nearly orbicular, rounded or somewhat wedge-shaped at the base, abruptly sharp-pointed at the apex, and are a half inch to an inch long, and a half inch or a little more wide; they are of firm texture, appressed-hairy, the hairs fewer at fruiting time. The small cymes, terminating the lateral branches, have two to four flowers, rarely a single flower, about a quarter of an inch long; the globose hypanthium and spreading calyx are appressed-pubescent, forming together a bell-shaped body; the five sepals are ovate, acutish; the five petals are erect, white with rose markings, ovate, obtuse or acutish. The fruit is bright red, broadly obovoid, and three eighths to a half inch long.

A fine shrub, native of the temperate regions of Khasia and Sikkim in the Himalayas. It is one of the best of the red-fruited shrubs, a worthy addition to any collection. It is open in habit, with wand-like branches, bearing in June little clusters of white and rose flowers; these later mature into the brightest of fruits, which persist for some time. It was introduced into cultivation before 1869, when it was first described from specimens secured at a nursery in Weymouth, England. The illustration was made from a specimen which has been in the collections of the New York Botanical Garden since 1897. This shrub may be propagated by seeds sown or stratified in the fall, or by grafting.

This is one of about forty species which comprise the genus *Cotoneaster*, distributed mainly in the temperate regions of Europe and Asia, with a few in northern Africa; curiously enough none are known from Japan. The fruit is red or black, the former of course being much preferred on account of its greater attractiveness.

The members of this genus will grow in any ordinary soil, but they are not fond of very moist or shady locations.

GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1.—Fruiting branch. Fig. 2.—Flowering branch. Fig. 3.—Flower, × 4

ECHEVERIA NODULOSA

(Plate 92)

ECHEVERIA NODULOSA

Red-margined Echeveria

Native of southern Mexico

Family CRASSULACEAE ORPINE Family

Cotyledon nodulosa Baker, in Saund. Ref. Bot. *pl. 56.* 1869.
Echeveria nodulosa Otto, Hamb. Gartenz. 29: 8. 1873.

A perennial with stems one to two feet long in the wild state, often in cultivation flowering when only a few inches high, naked below, crowned by an open or sometimes a dense rosette of leaves. The flowering stems, one or more, are erect and leafy below. The leaves are obovate to spatulate, two to three inches long, gradually becoming smaller on the flowering stems, red on the margin. The inflorescence is an equilateral raceme of four to eight flowers, the pedicels short, the longest ones not quite half an inch long. The five sepals are spreading. The corolla is half an inch long, and strongly five-angled.

This plant was originally described by J. G. Baker from specimens supposed to have come from Mexico, and grown by W. Wilson Saunders of Hillfield, Reigate, England; it was also illustrated by Saunders.

Until 1899 the original description and illustration represented our entire knowledge of this plant. In that year J. N. Rose rediscovered the plant on Mount Alban, near Oaxaca City, Mexico, and brought back to Washington living specimens which have been distributed widely. It has frequently flowered, both in Washington and in the New York Botanical Garden. In 1906 C. Conzatti of Oaxaca, Mexico, also collected living specimens and it was from these, which flowered in the New York Botanical Garden, July 24, 1911, that our accompanying illustration was made.

The sixty or more species of *Echeveria* are divided into two groups. The group to which *E. nodulosa* belongs contains about one third of the species and has axillary flowers arranged in equilateral racemes or slender interrupted spikes. The other group has flowers arranged in simple secund terminal racemes or sometimes compounded and in panicles.

J. N. ROSE.

HELIANTHUS ORGYALIS

(Plate 93)

HELIANTHUS ORGYALIS

Linear-leaved Sunflower

Native of south-central and western United States

Family CARDUACEAE THISTLE Family

Helianthus orgyalis DC. Prodr. **5**: 586. 1836.

A tall perennial herb, from widely spreading rootstocks. The leafy stems are glabrous, somewhat glaucous, striate, slender but strong, six to ten feet high and much branched above. The leaves are alternate, sessile, linear, acuminate, with a few scattered shallow teeth; they are less than one half inch wide and up to eight inches long, recurved and drooping, and rough with pointed papillae, especially on the lower surfaces. The branching inflorescence bears many heads of flowers, which are about two inches across, the neutral ray-flowers being very conspicuous, ten or more in number, with ligules an inch long, a half inch wide, and rich yellow in color. The disks are small, dark brown or purple, made up of several perfect, fertile flowers with yellow tubes swollen near the base, and four or five brownish spreading lobes surrounding the erect brown anthers and a prominent, two-parted yellow style. The heads are surrounded by involucres of bracts in many series; these are spreading, lanceolate to subulate, squarrose and with ciliate margins. The receptacles are convex, with laciniate-toothed chaff. The achenes are four-sided, truncate, with a pappus of a few scales.

This sunflower was first described by DeCandolle from a cultivated specimen in the botanic garden at Geneva, said to have been grown from seed sent from Arkansas Territory by M. de Pourtales. It grows naturally on the dry plains from Nebraska to Texas and westward. With the graceful habit of a *Coreopsis*, it has none of the coarseness of many of the sunflowers. Its tall slender stems, arching leaves, and many bright yellow flowers make it one of our best perennials for the background of deep borders.

Plants growing in our borders since 1911 furnished the specimen for our illustration. The blooming period here is September and October. Their propagation is best effected by division of the roots and their cultivation is simple.

KENNETH R. BOYNTON.

SYMPHORICARPOS ALBUS LAEVIGATUS

(Plate 94)

SYMPHORICARPOS ALBUS LAEVIGATUS

Snowberry

Native of northern North America

Family CAPRIFOLIACEAE HONEYSUCKLE Family

Symphoricarpos racemosus laevigatus Fernald, Rhodora **7**: 167. 1905.
Symphoricarpos albus laevigatus Blake, Rhodora **16**: 119. 1914.

A shrub up to four feet tall, with erect or ascending purplish gray or gray branches, somewhat drooping glabrous branchlets, and white and rose flowers which are followed by snow-white fruit. The opposite leaves, glabrous except for the ciliate margins, have petioles less than a quarter of an inch long; the blades are oval or nearly orbicular, obtuse at each end, up to one and a half inches long and an inch wide, and are paler beneath. The flowers, about three eighths of an inch long, are in few-flowered axillary clusters toward the end of the branches, forming a somewhat interrupted spike; the calyx is superior and has short lobes; the corolla is bell-shaped, about a quarter of an inch long, is somewhat swollen at the base, pubescent within, and in color white and rose, the obtuse or acutish lobes about half the length of the corolla. There are five stamens, which are shorter than the corolla, as is also the style. The fruit is of a snowy whiteness, often a half inch or more in diameter.

This native shrub is found from Quebec to Washington, and south in the mountains to Virginia. It is of the easiest culture, accommodating itself to almost any environment, thriving in sun or shade; in fact, so prone is it to spread by means of suckers that its tendency in this direction must be checked if other shrubs in its neighborhood are to survive. This habit of making suckers would indicate its ease of propagation, and such is the case. It may also be propagated by means of seeds, and by hard and green-wood cuttings. The specimen from which the illustration was prepared has been in the collections of the New York Botanical Garden for many years. This is one of the best of our shrubs on account of its handsome white fruit, which occurs in great abundance and persists well through the winter.

Symphoricarpos is a genus of about sixteen species, all but one natives of North America, where they extend as far south as Mexico, the exception being found in western China.

GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1.—Fruiting branch. Fig. 2.—Flowering branch. Fig. 3.—Flower, × 4.

SINNINGIA SPECIOSA

(Plate 95)

SINNINGIA SPECIOSA

Maximilian's Ligeria

Native of Brazil

Family GESNERIACEAE GESNERIA Family

Sinningia speciosa Hiern, Vidensk. Meddel. **1877–8**: 91. 1877.
Gloxinia speciosa Lodd. Bot. Cab. *pl. 28.* 1817.
Ligeria maximiliana Hanstein, in Martius, Fl. Bras. 8^1: 387. 1864.

Stemless or nearly so. The basal leaves are often numerous, forming broad rosettes, short-petioled, the blades ovate to oblong, two to six inches long, softly pubescent on both sides, acute, obtusely crenate, bright green above, very pale beneath. The two or more peduncles are strict, two to four inches long, pubescent. The five calyx-lobes are greenish, lanceolate, acuminate, pubescent, one half to two thirds of an inch long; there are five ovate glands at the bottom of the calyx-tube. The corolla is tubular, and either pendent or horizontal, one and one half to two inches long, somewhat curved, purple, with five broad, short, spreading or reflexed lobes.

This plant comes from Eastern Brazil, where it was collected by J. N. Rose near Cabo Frio, in the state of Rio de Janeiro, August 8, 1915. Several tubers were sent to the New York Botanical Garden which have since produced flowers repeatedly and profusely. The plant has also fruited and from the seed a number of other specimens have been obtained.

This species has been known in cultivation since early in the nineteenth century as *Gloxinia speciosa*, but it is generally accepted that it is not congeneric with the original species of that genus, namely, *G. maculata*. It will however always be best known in the trade under that name. To botanists it is now generally known as a *Sinningia* although it has also passed as a species of *Ligeria*. *Sinningia* and its related genera contain many ornamental species and deserve a re-study under modern taxonomic method from living plants preferably in some tropical garden like that at Rio de Janeiro, Brazil. *Sinningia speciosa* has undergone many changes in cultivation especially as to the color, shape and size of the flowers, while a number of species in several genera described from wild plants have been referred to it. Consequently the number of synonyms both for indigens and for cultigens is considerable. The

plant which we have described and figured here is not typical *Sinningia speciosa,* but is the *Ligeria maximiliana* described by Hanstein in 1864, which also came from Cabo Frio, Brazil.

J. N. ROSE.

EXPLANATION OF PLATE. Fig. 1.—Flowering plant. Fig. 2.—Dissection of flower, showing stamens.

STYLOPHORUM DIPHYLLUM

(Plate 96)

STYLOPHORUM DIPHYLLUM

Celandine Poppy

Native of central United States

Family PAPAVERACEAE — POPPY Family

Chelidonium diphyllum Michx. Fl. Bor. Am. **1**: 309. 1803.
Stylophorum diphyllum Nutt. Gen. **2**: 7. 1818.
Meconopsis diphylla DC. Syst. Veg. **2**: 88. 1821.

A perennial herb with abundant yellow sap, growing nearly two feet high, from short rootstocks, and bearing many large yellow flowers in May. The stems are smooth or somewhat setose, purplish above, especially in the inflorescence. The leaves are smooth, or somewhat hairy, glaucous beneath and dull green above; they are pinnatifid, with oblong, sinuate lobes. The lower leaves are alternate and measure six inches or more in length; the two uppermost are opposite, subtending the inflorescence, shorter, rounded and more hairy. The yellow flowers are seldom solitary, usually clustered, on long setose peduncles which are pendulous in bud and fruit, and measure one to two inches across. There are two rounded concave sepals, and four obovate petals. Twenty or more stamens with short filiform filaments and oblong orange-yellow anthers surround the base of the conspicuous green pistil, comprising an ovoid one-celled ovary, a prominent style and a three-lobed stigma. The capsule is bristly, many-seeded, and tipped with the persistent style.

The celandine poppy is one of several species of *Stylophorum*, others being found in China, Japan, and the Himalayas. It is found growing naturally in low woods from Pennsylvania and Ohio to Tennessee and westward to Wisconsin and Missouri. Although closely related to our blood-root and to the Asiatic *Hylomecon*, its nearest relative is the celandine, *Chelidonium majus*, which has very similar leaves and the same copious yellow sap. It is distinct however in the flower, and by its bristly, thickened capsule with persistent style instead of a linear, smooth capsule and style almost none.

Our illustration was made from plants growing since 1915 in the Herbaceous Grounds, where they seem to thrive as well in the open as the celandine does. They are hardy and very floriferous in spring and early summer. The cultivation of this species appears to be little undertaken, although it was introduced into England in

1854, and grown there to some extent. Experience with it in the New York Botanical Garden would seem to justify its use as a border plant. Propagation is by seeds and division of the roots, but, like many plants of the Poppy family, transplanting is rather difficult.

KENNETH R. BOYNTON.

ARONIA ARBUTIFOLIA

(Plate 97)

ARONIA ARBUTIFOLIA

Red-fruited Choke-berry

Native of eastern North America

Family MALACEAE APPLE Family

Mespilus arbutifolia L. Sp. Pl. 478. 1753.
Pyrus arbutifolia L. f. Suppl. 256. 1781.
Mespilus arbutifolia erythrocarpa Michx. Fl. Bor. Am. **1**: 292. 1803.
Aronia arbutifolia Ell. Bot. S. C. & Ga. **1**: 556. 1821.

A branching shrub, sometimes attaining a height of twelve feet, but usually much smaller, commonly about five feet high. The slender young twigs are gray; the bark of old stems nearly smooth and dark gray; the narrow winter buds are about one quarter of an inch in length. At our latitude the leaves unfold in April and fall in late autumn; the blades are oval, oblong or obovate, obtuse or abruptly short-tipped, narrowed or somewhat wedge-shaped at the base, three inches long or less, the margin serrulate-crenulate, the upper surface nearly or quite smooth, the midvein bearing small glands, the lower surface persistently white-woolly; the petiole is much shorter than the blade; the small narrow stipules are early deciduous. The flowers, borne in terminal compound woolly cymes, are from four to six lines broad, and open in the south in March, in the north in May or early June. The calyx is woolly, with five acute, very glandular lobes; the five obovate, obtuse, white or faintly purplish petals are nearly a quarter of an inch long. The fruit is a short-pyriform or subglobose drupe, one third to one half an inch in diameter, bright red when mature, and persists on the twigs until late autumn or early winter.

The red-fruited choke-berry grows naturally in swamps, wet woods and thickets, from New England to Florida, extending west to Ohio and Louisiana. Its close relative, *Aronia atropurpurea*, was described and illustrated in this volume, at plate 81.

The plant from which our illustration was made is growing in the fruticetum, New York Botanical Garden; it was obtained from Meehan & Sons in 1895.

N. L. BRITTON.

EXPLANATION OF PLATE. Fig. 1.—Fruiting branch. Fig. 2.—Flowering branch.

HAMAMELIS JAPONICA

(Plate 98)

HAMAMELIS JAPONICA

Japanese Witch Hazel

Family HAMAMELIDACEAE WITCH-HAZEL Family

Hamamelis japonica Sieb. & Zucc. Abhandl. Akad. Muench. **4**: 193. 1843.
Hamamelis arborea Masters, Gard. Chron. **35**: 187. 1874.

A shrub or small tree, sometimes attaining a height of thirty feet, with rather stout ascending or spreading branches which are covered with a brown bark, the young branchlets, leaf-buds, flower-stalks, and bracts pubescent with brown hairs. The leaves, which appear much later than the flowers, are alternate and on pubescent stalks one quarter to three eighths of an inch long. The glabrous or pubescent leaf-blades are oval to broadly ovate or obovate, or even nearly orbicular, with the margins sinuately crenate, and the veins very prominent beneath; they are from two to four inches long and sometimes nearly as wide, with the apex acute and the inequilateral base rounded or obtuse. The flower-heads, arranged singly or in clusters of two or three, are subtended by orbicular bracts and are on pubescent commonly curved stalks. When spread out the calyx is about a third of an inch across, with the elliptic obtuse lobes densely brown pubescent on the outside, glabrous and purple within. The yellow petals are narrowly linear, undulate, and a half inch to sometimes three quarters of an inch long. The stamens are about half as long as the sepals, the anthers purplish, the filaments yellowish. The hairy ovary is of two carpels, each with a slender purple style. The pubescent fruit is about a half inch long, surrounded at the base by the persistent calyx-tube, the carpels united nearly to the summit, the free portions forming spreading or recurved horns.

This native of the mountainous woods of Japan is one of the most attractive shrubs of our gardens. At home it flowers in March and April, but here it shows a tendency to break into blossom much earlier than this; in 1916 its golden flowers appeared in January on a specimen in the fruticetum collection of the New York Botanical Garden, and persisted well into February through a heavy snowfall, the bright blossoms forming a striking contrast with the wintery surroundings. Not only does the early appearance of its blossoms make it welcome, but their brightness and profusion make it doubly so.

While this Japanese plant is among the first to tell us that winter is waning, and that spring will be here ere long, its close relative, *Hamamelis virginiana*, a native of the eastern parts of our own country, is the latest to flower of our eastern shrubs, its flowers appearing late in the fall and sometimes persisting into early winter.

It is this difference in flowering period which constitutes its chief value in horticulture, for botanically the differences separating the two species, while valid, are not marked, the most conspicuous being the purple color of the inside of the calyx in *Hamamelis japonica*, which serves to intensify the yellow of the petals. In blossom both are equally conspicuous, for the Japanese plant bears its flowers before the leaves appear, while our plant takes on its mantle of gold after the leaves have fallen.

About 1862 the Japanese witch hazel was introduced into cultivation by von Siebold, according to a statement made by Masters in the Gardners' Chronicle early in 1874. It was apparently first offered for sale in a trade catalogue issued by Messrs. Ottolander, of Boskoop, Holland, as *Hamamelis arborea*, under which name it was described by Masters. It appears to be somewhat variable as to habit and color of flowers, and the form of more vigorous growth and larger flowers with a purple calyx represents what is now called *H. japonica arborea* Rehder, the *Hamamelis arborea* of Masters. The plant from which the illustration was prepared was secured at the Royal Gardens, Kew, in 1901, and has been in the collections of the New York Botanical Garden since that time.

The genus *Hamamelis* contains four species, equally divided between Asia and America. In addition to the common species of the United States, *Hamamelis virginiana*, another, *H. vernalis*, is known from the south central United States; the latter blossoms in the spring. One Asiatic species is here illustrated, the other, *Hamamelis mollis*, is from Central China. They thrive best in a somewhat moist soil, the Japanese species, however, doing well in a drier situation than the others, while *H. virginiana* flourishes not only in shady places, its preference in the wild, but also in sunny positions. They may be propagated from seeds, which do not germinate until the second year, or by layering; they may also be grafted in the spring, in the green-house, on seedlings of *Hamamelis virginiana*.

GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1.—Flowering branch. Fig. 2.—Flower, × 3. Fig. 3.—Fruit. Fig. 4.—Leaf.

HIBISCUS MOSCHEUTOS

(Plate 99)

HIBISCUS MOSCHEUTOS

Swamp Rose-Mallow

Native of eastern United States

Family MALVACEAE MALLOW Family

Hibiscus Moscheutos L. Sp. Pl. 693. 1753.
?*Hibiscus palustris* L. Sp. Pl. 693. 1753.
Hibiscus opulifolius Greene, Leaflets **2**: 65. 1910.

A perennial herb, usually five or six feet tall, with numerous cane-like stems. The leaves are ovate or ovate-lanceolate, obtuse or slightly cordate at the base, acuminate at the apex, palmately veined, dentate or slightly crenate, densely but finely white stellate-pubescent beneath and usually only slightly pubescent above. The blades of the largest leaves are somewhat three-lobed. The stems, petioles and veins are with or without red pigmentation. The petioles and peduncles are often adnate to each other. The calyx-lobes are ovate. The corollas are large (often as much as 7 inches in diameter) and conspicuous; in color they range from white through various shades of pink, with or without an eye which is of a darker shade than the blade. The stamens are of nearly equal length. The pollen is either white or yellow. The style-branches are short, spreading but not recurving, and with decidedly expanded stigmatic surfaces. The capsules are ovoid, about one inch long, glabrous or slightly pubescent, and abruptly short-pointed or blunt. The seeds are reniform and glabrous.

This species grows in abundance along the coastal region of the eastern United States, extending inland in scattered stations to Missouri. It evidently reaches its greatest development in numbers in the marshes along the coast of central and southern New Jersey, where its tall vigorous growth and gayly-colored, conspicuous flowers make it a noticeable and popularly well known feature of the vegetation. Here there is a medley of flower-colors, illustrating well the polymorphism that has long been recognized in this species. Several of the forms have been found to breed true (Torreya **17**: 142–148) as distinct races; numerous other races undoubtedly exist. There will probably always be some doubt as to the identity, at least in respect to flower color, of the particular American plant which Linnaeus included in his citations. The flower shown in the accompanying illustration is from a cultivated plant whose seed-parent grew wild at Hunter's Island in Long Island Sound. The type which it represents may be found in nearly all stations

for the species along the coast north of Cape May which is as far south as the writer has made field observations. In northern stations of the range (Ohio, Presque Isle in Lake Erie, and along the Seneca River near Weedsport and Savannah, N. Y.) this is the only form represented. This type or race appears to be the one most widely distributed at least in the area north of Cape May.

The range of this species overlaps somewhat the ranges of several species more exclusively southern and western in distribution. Natural hybrids between these undoubtedly exist; certain of these species have been hybridized in the production of races of horticultural value.

A. B. STOUT.

EXPLANATION OF PLATE. Fig. 1.—Flowering stem. Fig. 2.—Fruit. Fig. 3.—Seed, × 3.

SOBRALIA SESSILIS

(Plate 100)

SOBRALIA SESSILIS

Sessile-flowered Sobralia

Native of Guiana

Family ORCHIDACEAE ORCHID Family

Sobralia sessilis Lindl. Bot. Reg. **27**: Misc. 3. 1847.

Stems clustered, up to four feet tall, branched at some of the upper nodes; these branches, developing roots, may be used in propagating new plants. The stems, sheaths, and under surface of the leaf-blades are pubescent with short black spreading hairs. The leaves are alternate, narrowly elliptic to elliptic-lanceolate, narrowed to an obtuse base, the apex acute; the undulate blades are up to six inches long and two inches wide, and are rather prominently seven-nerved beneath. The flowers, about two and a half inches long and broad, are in terminal few-flowered spikes, only one flower appearing at a time, the acute bracts pubescent like the leaf-sheaths. The rose-colored sepals, paler beneath, are oblong-elliptic, abruptly acute, about one and a half inches long, the lateral spreading, the dorsal ascending. The petals resemble the sepals in color and shape, but are broader and a trifle shorter. The lip, about as long as the petals, entirely surrounds the column; the tube is paler below, darkening above into the rich rose-purple of the short limb, which is undulate, crisped and irregularly toothed on the margin; the inside of the tube is a rich magenta. The column is club-shaped, about half as long as the lip, white faintly flushed with rose. The anther is yellow.

The plant from which this illustration was prepared formed part of a collection of orchids presented in 1900 by Mrs. George Such to the New York Botanical Garden, where it has flowered repeatedly. This, one of the least conspicuous of the genus, was discovered in Demerara by Schomburgk, and flowered in the latter part of 1840 at the nurseries of Messrs. Loddiges, in England.

The genus *Sobralia*, comprising about sixty species, is found in tropical America from Peru to Guiana and Mexico. The species vary greatly in size, some being but a foot high, while others have stems ten feet tall or more. Some species have small flowers, while in others the flowers are as large and as showy as those of *Cattleya labiata*. In color the blossoms range from white to yellow, and from rose and purple to almost a blue. One of the larger and showy kinds is *Sobralia macrantha*, a native of Mexico and Guate-

mala. They are usually of easy culture, requiring an abundance of water during the growing season, and do best if allowed a period of rest, when water is withheld, but never to the extent of allowing the soil to become quite dry.

GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1.—Flowering branch. Fig. 2.—Column, side view. Fig. 3.—Column, front view. Fig. 4.—Pollinia, side view, × 5. Fig. 5.—Pollinia, rear view, × 5. Fig. 6.—Anther, × 5.

CONTENTS OF VOLUME 1

CONTENTS OF VOLUME 2

CONTENTS OF VOLUME 3

CONTENTS

ADDISONIA

COLORED ILLUSTRATIONS
AND
POPULAR DESCRIPTIONS
OF
PLANTS

VOLUME 3 NUMBER 3

SEPTEMBER, 1918

PUBLISHED BY
THE NEW YORK BOTANICAL GARDEN
(ADDISON BROWN FUND)
SEPTEMBER 30, 1918

ANNOUNCEMENT

A bequest made to the New York Botanical Garden by its late President, Judge Addison Brown, established the

ADDISON BROWN FUND

"the income and accumulations from which shall be applied to the founding and publication, as soon as practicable, and to the maintenance (aided by subscriptions therefor), of a high-class magazine bearing my name, devoted exclusively to the illustration by colored plates of the plants of the United States and its territorial possessions, and of other plants flowering in said Garden or its conservatories; with suitable descriptions in popular language, and any desirable notes and synonomy, and a brief statement of the known properties and uses of the plants illustrated."

The preparation and publication of the work have been referred to Dr. John H. Barnhart, Bibliographer, and Mr. George V. Nash, Head Gardener.

ADDISONIA is published as a quarterly magazine, in March, June, September, and December. Each part consists of ten colored plates with accompanying letterpress. The subscription price is $10 annually, four parts constituting a volume. The parts will not be sold separately.

Address:

THE NEW YORK BOTANICAL GARDEN
BRONX PARK
NEW YORK CITY

Subscribers are advised to bind each volume of ADDISONIA as completed, in order to avoid possible loss or misplacement of the parts; nearly the whole remainder of the edition of Volumes 1 and 2 has been made up into complete volumes, and but few separate parts can be supplied. *New subscriptions will be accepted only as including the first volumes.*

CORNUS MAS

(Plate 101)

CORNUS MAS

Cornelian Cherry

Native of southern Europe and Asia Minor

Family CORNACEAE Dogwood Family

Cornus Mas L. Sp. Pl. 117. 1753.

A shrub or small tree, of dense growth, up to twenty feet tall. The young branchlets are minutely appressed-pubescent, in age becoming glabrous. The leaves are opposite, the petioles a quarter inch long or less; the blades, which are up to three inches long and two inches wide, are elliptic to ovate, acuminate into a usually obtuse apex, at the base commonly rounded or sometimes cuneate, and with both surfaces appressed-pubescent, the lower paler and with tufts of ashen hairs in the axils. The yellow flowers, in which the sepals, petals and stamens are usually in fours, appear before the leaves, and are in opposite clusters of a dozen or so, terminating short branchlets, each cluster subtended by an involucre of four broadly elliptic brownish obtuse bracts which are appressed-pubescent. The pedicels and calyx-tube, the latter adherent to the ovary, are appressed-hairy. The calyx-lobes are small and triangular. The lanceolate petals are spreading or somewhat reflexed. The stamens are shorter than the petals and alternate with them. The scarlet fruit is about three quarters of an inch long.

In the latter part of April or early May, in the neighborhood of New York City, the flowers of this plant appear, the absence of the foliage at that time making the flowers all the more conspicuous. The bright flowers are followed by a dark green foliage, which, in contrast with the scarlet fruit of the later months, again makes of this plant a most striking object. It is effective as an individual specimen or for mass planting. The specimen from which the illustration was prepared has been in the collections of the New York Botanical Garden since 1906.

The fruit though edible is not palatable, but is sometimes used in the countries where it grows naturally as a substitute for olives. It is also employed there for preserves, and is said to be made use of by the Turks for flavoring sherbet.

This species is closely related to another, *Cornus officinalis*, of Japan, which was illustrated at plate 89 of this work. The tufts of hairs in the leaf-axils of this are ashen, readily distinguishing it from the other in which the hair-tufts are brown.

GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1.—Flowering branch. Fig. 2.—Flower, × 4. Fig. 3.—Fruiting branch.

SOLIDAGO SQUARROSA

(Plate 102)

SOLIDAGO SQUARROSA

Ragged Goldenrod

Southeastern Canada and eastern United States.

Family CARDUACEAE THISTLE Family

Solidago squarrosa Muhl. Cat. 76. 1813.
Solidago confertiflora Nutt. Jour. Acad. Phila. 7: 102. 1834.

A perennial plant with a radiculose stout rootstock. The stem is erect, five feet tall or less, pale or more often tinged with red or purple, finely and often copiously pubescent, glabrate and terete or nearly so below, permanently pubescent and ridged above, simple below the inflorescence, or individually or exceptionally branched. The leaves are alternate, and rather conspicuous. The blades are various, thickish, deep green above, paler and finely lined beneath, finely pubescent on the principal veins, especially beneath, and ciliate; those of the basal and lower cauline leaves obovate, oval, elliptic, or ovate, narrowed into petiole-like bases, with stouter midribs of equal length or shorter, coarsely, often doubly or irregularly, serrate; those of the upper cauline leaves much smaller than those of the lower, oblanceolate, elliptic, or lanceolate, mostly acute or short-acuminate, shallowly toothed or entire, narrowed into short petiole-like bases or sessile; those of the inflorescence (bracts subtending the panicle-branches) much reduced. The heads are few or several together, on short ascending approximate or distant branches which form a terminal elongate thyrsus. The involucres are campanulate, about a third of an inch long. The bracts of the involucre are in several series, decidedly imbricate; the outer ones are ovate to lanceolate, acute or obtuse; the inner narrowly elliptic to linear-elliptic, or slightly broadened upward, or nearly linear, obtuse; all with spreading or recurved green tips, ciliolate, the exposed parts more or less pubescent. The ray-flowers are conspicuous, nine to sixteen in number, with yellow elliptic ligules a sixth of an inch long or more. The disk-flowers are numerous, with yellow 5-lobed corollas about one fourth of an inch long divided into a cylindric tube, a larger narrowly funnelform throat and the lobes; the lobes are ovate or ovate-lanceolate, thick-margined. The anthers are whitish, united in a ring, with lanceolate tips, each sac acuminate at the base. The filaments are slender-filiform, as long as the anthers or longer. The hypanthium is glabrous, longitudinally striate. The style is filiform, glabrous. The stigmas are subulate or lanceolate-subulate. The achene is ribbed, glabrous, narrowed at the base, more or less contracted at the apex. The pappus consists of numerous white or nearly white bristles several times as long as the achene.

Among our hundred odd kinds of goldenrods the species here illustrated is wholly distinctive. It falls within a group, which includes only two or three other species, characterized chiefly by the spreading or recurved green tips of the bracts of the involucre; but it is quite easily distinguishable from its near relatives.

This plant was detected by Muhlenberg in Lancaster County, Pennsylvania, in the early part of the past century, and was first mentioned by him in his "Catalogus plantarum Americae septentrionalis" in 1813. It is such a clear-cut species that only once was there any confusion concerning it so that it was named a second time.

The geographic range of this goldenrod extends from New Brunswick and Ontario southward to Georgia, in the Piedmont and mountain regions. It has not been found in the Coastal Plain. The altitudinal distribution extends from near sea-level to several thousand feet in the Alleghenies.

Its favorite habitat is the steep or at least sloping rocky banks of streams, where at the height of its flowering season it quite eclipses all its associates. It is an erect plant with a strict inflorescence; but does not suggest stiffness in habit. Its large conspicuously clean deep-green leaves, which are usually wholly free from the fungous diseases so common on the foliage of many kinds of goldenrod, and its erect narrow plumes of bright-yellow flowers are particularly attractive to the eye.

The specimens from which the accompanying illustration was made were collected near the southern end of Lake Oscawana, Putnam County, New York, in open woods on a rocky hillside.

JOHN K. SMALL.

EXPLANATION OF PLATE. Fig. 1.—Inflorescence. Fig. 2.—Flowering head, × 2. Fig. 3.—Lower leaf.

CALLICARPA JAPONICA

(Plate 103)

CALLICARPA JAPONICA

Japanese Callicarpa

Native of Japan

Family VERBENACEAE VERVAIN Family

Callicarpa japonica Thunb. Fl. Jap. 60. 1784.

A shrub up to five feet tall, the purplish young branches and divisions of the inflorescence stellate-pubescent, the hairs on the former early deciduous. The leaves are opposite and with petioles a quarter inch long or less. The blades are elliptic, acute at the base and acuminate at the apex into a long point, and are glabrous on both surfaces; they measure up to three inches long and an inch and a half wide, and on the new vigorous shoots they are often larger; the margins are commonly entire at the base, becoming serrate above, the long apex usually however without teeth. The flowers are generally rose-pink, on short pedicels, and are borne rather numerously in axillary cymose clusters. The calyx is short, its teeth short and rounded. The bell-shaped corolla is about an eighth of an inch long, its four spreading lobes rounded. The stamens are much exserted from the corolla and bear bright yellow anthers. The fruit is an eighth to three sixteenths of an inch in diameter and of a bright violet color.

A most desirable shrub on account of the unusual color of its fruit which is borne in great abundance. It is found wild in the mountains of Japan in wooded areas. It thrives in the latitude of New York City, and is rarely damaged by cold. If, however, it is injured during the winter it sends up in the spring new shoots from the root which flower and bear fruit the same year. It may be readily propagated by seeds, in spring or summer by greenwood cuttings under glass, and by hardwood cuttings and by layers. The specimen from which the illustration was prepared has been in the collections of the New York Botanical Garden since 1895.

Callicarpa is found in tropical and subtropical regions of Asia, Australia, the islands of the Pacific, and in North and Central America. Its known species are about thirty-five, of which one is *Callicarpa americana*, a native of the southeastern United States, where it is known as French mulberry.

GEORGE V. NASH

EXPLANATION OF PLATE. Fig. 1.—Fruiting branch. Fig. 2.—Flowers. Fig. 3.—Flower, × 4.

ASTER LAEVIS

(Plate 104)

ASTER LAEVIS

Smooth Aster

Native of the eastern and middle United States and Canada

Family CARDUACEAE THISTLE Family

Aster laevis L. Sp. Pl. 876. 1753.

A firmly erect, little branched, perennial herb, commonly two to three feet high. The entire plant is very smooth and glabrous and more or less glaucous or glaucescent, appearing of a pale green color. The thickish or somewhat fleshy leaves are oblong-lanceolate varying to oblanceolate and, more rarely, broadly ovate, and are entire or subserrate, and slightly roughened along the edges; the apex is acute or somewhat obtuse; at full size they are commonly three to five inches long. Those low on the stem are narrowed into winged petioles; those higher up are sessile by a heart-shaped partly clasping base, and, by gradual reduction along the flowering branches, pass into the firm subulate bracts of the inflorescence. The heads are one inch or more broad, and are terminal on firm bracteolate branchlets along the branches of a close panicle. The involucre is campanulate, its whitish-coriaceous imbricated bracts having hardened acutish tips. The broadish rays, fifteen to thirty in number, vary in color from deep blue to violet; the rather prominent disc is clear yellow, changing to purplish in age. The achenes are glabrous, or nearly so, and are crowned with a tawny pappus.

No one well knowing our asters in their native haunts will deny to this one a place among those that uphold their aster lineage with especial attributes of grace and beauty. It is a firmly upstanding plant, and with something of distinction in its bearing even before its flowers display their trim perfection of form and the bright purity of their deep sky blue or paler violet.

It is appropriate that this, of all asters, should bear the name *Aaster laevis*—the smooth aster. Its smoothness is of a quality that needs no verification of the touch to make it instantly true to the eye. An almost waxy firmness gives a sort of resistant pliancy to the leaves which, with the herbage as a whole, are veiled with a faint whitish bloom, like a plum or grape, that when pressed off by a touch, reveals the bright light green of the shining surface beneath.

Like most asters this species has its divergent forms, some of which have been given distinctive names. But no one of these

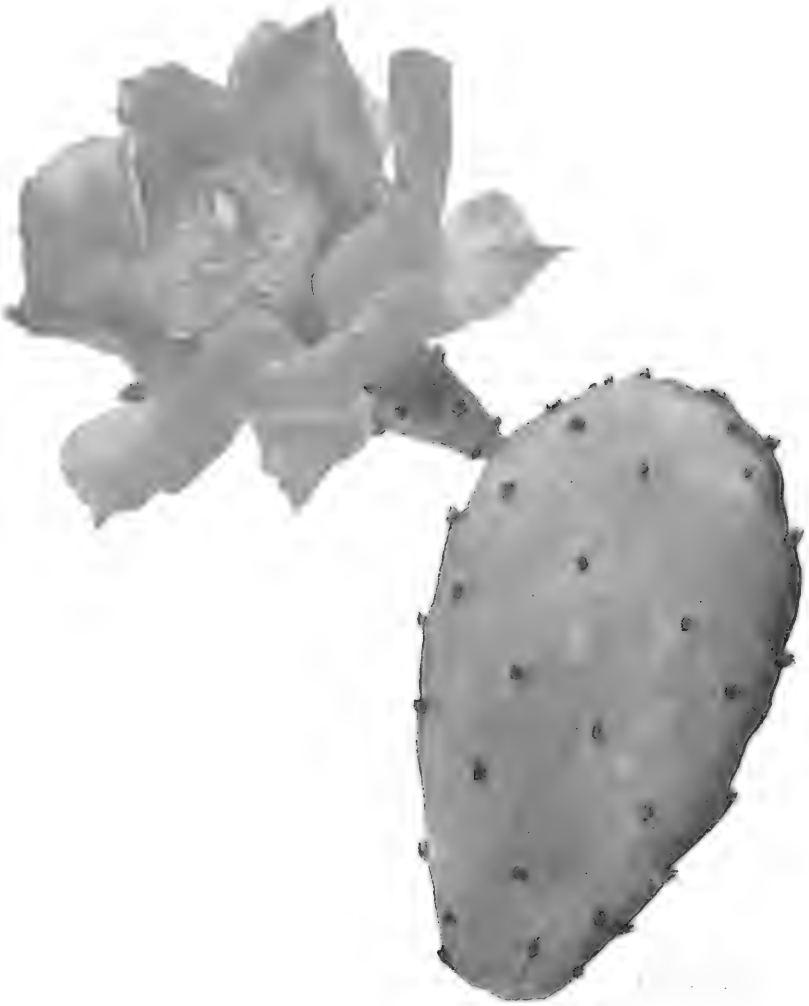
variants seems to have succeeded in detaching itself very successfully from the controlling individuality of the true plant which blends all together into one general species.

This is an an aster mainly of dry open ground, sometimes grouping itself closely on sandy levels, but more often of freer growth along fields and woodsides or, among inland hills, scattered, as the soil may permit, along stony roadside banks.

In the east its distribution extends from Pennsylvania and New Jersey to the coast region of New York and on through New England into Maine; thence it ranges to Ontario, and far towards the northwest, and south, it is said, to New Mexico and Louisiana.

E. P. BICKNELL.

EXPLANATION OF PLATE. Fig. 1.—Portion of flowering stem. Fig. 2.—Involucre, × 2. Fig. 3.—Lower leaf.



OPUNTIA OPUNTIA

(Plate 105)

OPUNTIA OPUNTIA

Eastern Prickly Pear

Native of the eastern United States

Family CACTACEAE — CACTUS Family

Cactus Opuntia L. Sp. Pl. 468. 1753.
Cactus Opuntia nana DC. Pl. Succ. Hist. **2**: *pl. 138* [*A*]. 1799.
Opuntia vulgaris Haw. Syn. Pl. Succ. 190. 1812. Not *Opuntia vulgaris* Mill. 1768.
Cactus humifusus Raf. Ann. Nat. 15. 1820.
Opuntia humifusa Raf. Med. Fl. U. S. **2**: 247. 1830.
Opuntia mesacantha Raf. Bull. Bot. Seringe 216. 1830.
Opuntia cespitosa Raf. Bull. Bot. Seringe 216. 1830.
Opuntia intermedia Salm-Dyck, Hort. Dyck. 364. 1834.
Opuntia nana Visiani, Fl. Dalmatica **3**: 143. 1852.
*Opuntia Rafinesquei** Engelm. Proc. Am. Acad. **3**: 295. 1856.
Opuntia vulgaris Rafinesquei A. Gray, Man. Bot. ed. 2. 136. 1856.

A prostrate cactus, often forming large patches, some of the joints erect or ascending, the roots long and fibrous. Its joints are light green and glabrous, faintly shining or when old dull, normally orbicular, elliptic, or obovate-elliptic, from two to four inches long and about one third of an inch thick; when growing in shade some of the joints may elongate and become six inches to ten inches long and not more than two inches wide. The areoles are small, round, and slightly elevated; the leaves, which fall away soon after the joints are fully grown, are awl-shaped and about one quarter of an inch long. The glochids are short, yellowish or brown. The plant is either quite spineless or some of the areoles bear a needle-shaped brownish or nearly white spine from half an inch to about two inches long; rarely two spines are borne at a few areoles; seedling plants, however, have several small spines at the areoles. The flowers, which appear in June or July in the north and in May in the south, are borne solitary at areoles on the edges of the joints; they vary from about two inches to about three and one half inches broad when fully expanded; the eight to ten petals are obovate, apiculate, bright yellow or sometimes with orange or red bases; the numerous yellow stamens are shorter than the petals and spread widely when the flower is fully open, when a slight shock causes them to incurve about the style; the obconic ovary is about an inch long and bears a few areoles like those of the joints, with similar glochids; the slender style is about as long as the stamens, and is topped by a white, several-lobed stigma. The fruit is a red, oblong to obovoid,

* Sometimes spelled *Rafinesquiana.*

juicy and edible berry, from one inch to two inches long, and contains many black seeds about one sixth of an inch broad.

This plant is widely distributed in the eastern United States and is the most northeastern in geographic range of any species of the cactus family. It is frequent on coastal sand dunes from eastern Massachusetts south to Virginia and occurs locally in sand or on rocks westward to Illinois and Missouri and southward to Georgia and Alabama. It has long been established in the mountains of northern Italy and of Switzerland, where it has been called *Opuntia nana*; plants sent to us under that name from the famous Hanbury Gardens at La Mortola, Italy, appear to be identical with wild ones of the vicinity of New York.

In botanical literature the species has often been described under the name *Opuntia vulgaris* Miller, but that name properly belongs to an altogether different, tall, erect cactus of wide distribution in eastern South America.

Races, or individual plants, of *Opuntia Opuntia* differ somewhat in size and shape of the joints and of the fruit, and in size of the flowers, and are with or without spines. Some of these have been regarded as distinct species or varieties by various authors and the synonymy of the plant is quite extensive, the names cited above being only the most important which have been applied to it. It has been suggested that plants with orange-based petals may be specifically distinct from those with pure yellow petals, although otherwise alike. We have grown the plant at the New York Botanical Garden from many localities and have observed it at many others. It grows naturally quite abundantly on rock out-crops within the New York Botanical Garden.

The plant from which our illustration was made was sent by Mr. E. P. Bicknell, in 1904, from Nantucket Island, Massachusetts.

N. L. BRITTON.

ILEX SERRATA ARGUTIDENS

(Plate 106)

ILEX SERRATA ARGUTIDENS

Japanese Sharp-toothed Winterberry

Native of Japan

Family AQUIFOLIACEAE HOLLY Family

Ilex argutidens Miq. Versl. Med. Akad. Wetensch. II. **2**: 84. 1868.
Ilex serrata argutidens Rehder, Bailey, Cyclop. Am. Hort. 798. 1900.

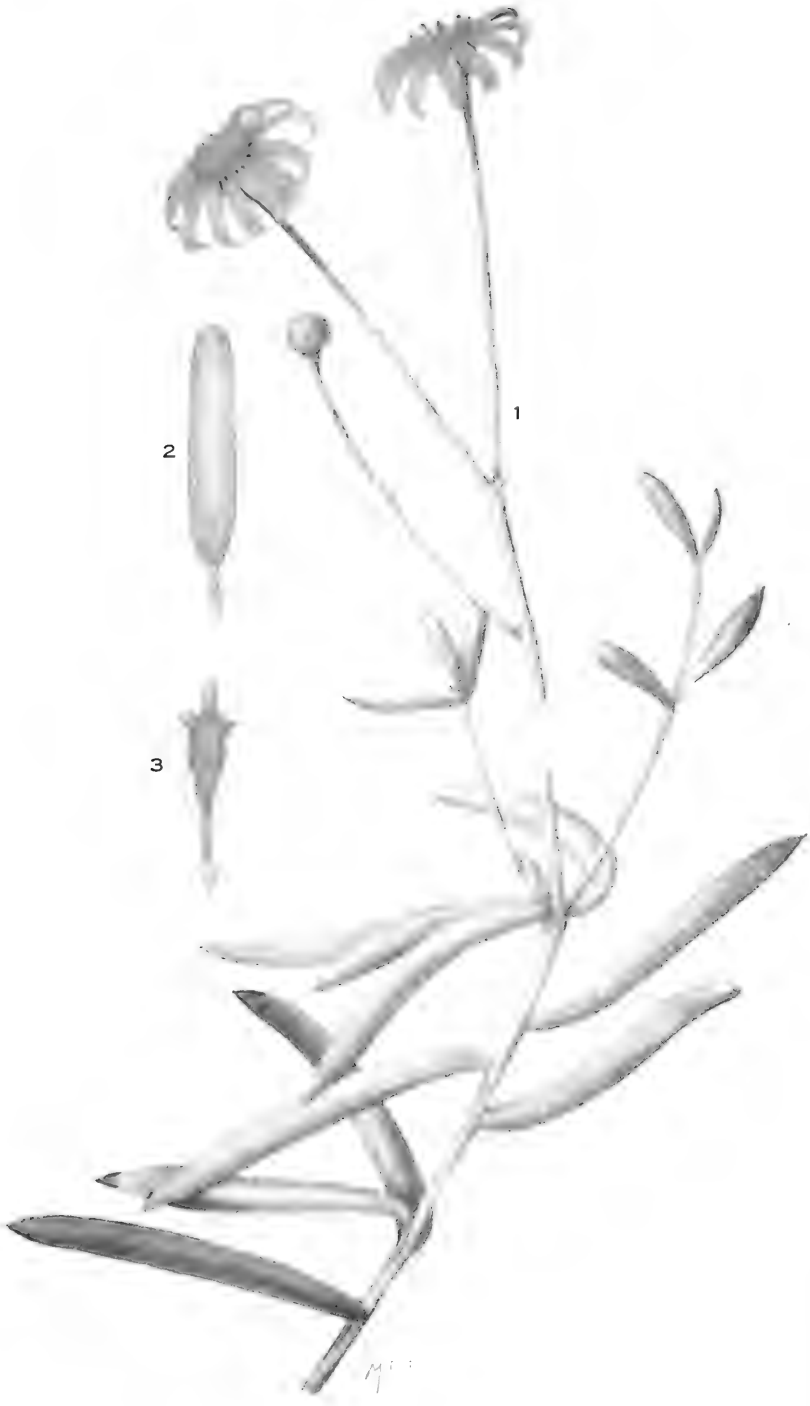
A slender shurb up to twelve or fifteen feet tall, the young branchlets purplish and minutely pubescent. The glabrous leaves are alternate, on short petioles a quarter inch long or less. The blades are elliptic, up to two inches long and an inch wide, acute at the base, and acute or acuminate at the apex; the lower surface is paler than the upper; the margins are rather irregularly serrate. The flowers, of a pale rose color, have the sepals, petals and stamens usually in fours, and are borne commonly singly in the axils of the leaves. The sepals are very short, the petals broadly oval and spreading. The stamens are shorter than the petals. The fruit, about three sixteenths of an inch in diameter, is a bright red.

This Japanese holly is closely related to the common winterberry of our swamps, resembling it much in habit; the fruit is of a similar color, but smaller, making up for this by the profusion in which it is borne. The specimen from which the illustration was prepared has been in the fruticetum collection of the New York Botanical Garden since 1895.

The genus *Ilex* contains nearly three hundred species, mainly distributed in America and Asia, with a few in Australia, Oceanica, Europe, and Africa. In the eastern United States there are about fifteen species; six of these are evergreen, the American holly, *Ilex opaca*, extending as far north as Massachusetts, and the inkberry, *Ilex glabra*, to Nova Scotia, while the remainder of the evergreen species do not range north of Virginia. Some of our most decorative fruiting shrubs are found in this genus, and one, *Ilex crenata*, of Japan, is one of the best broad-leaved evergreens.

GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1.—Fruiting branch. Fig. 2.—Flowers. Fig. 3.—Flower, × 5.



OTHONNA CRASSIFOLIA

(Plate 107)

OTHONNA CRASSIFOLIA

Thick-leaved Othonna

Native of south Africa

Family CARDUACEAE THISTLE Family

Othonna crassifolia Harvey; Harvey & Sonder, Fl. Cap. **3**: 336. 1865.

A tufted light green somewhat glaucous perennial succulent plant, with the lower leaves short and crowded, those on the stems more scattered and longer. The leaves are cylindric and usually curved, acute, from a quarter to three eighths of an inch in diameter, the lower ones up to two inches long and commonly purple-tipped, those on the spreading shoots longer and usually entirely green. The flowering stems are up to eight inches long, slender, somewhat branched; they arise from a whorl of leaves and commonly bear two to four flower-heads on long peduncles, and often one or two leaves. The heads are up to one inch broad, with a dozen or more ray-flowers and numerous disc-flowers. The corollas of the pistillate ray-flowers are ligulate, reflexed-spreading, bright yellow; the corolla of the disc-flowers is cylindric-bell-shaped, five-lobed, and of a deeper yellow.

A decorative little plant for the temperate house, especially useful in rockeries. Potted plants may also be plunged for the summer in a sunny spot in the garden, where they will soon make a vigorous growth and bloom freely. The main body of the plant is prostrate; the flowering stems, ascending for six or eight inches and lightly veiled with a whitish bloom, and the bright yellow flowers make a pleasing combination. It has a long flowering period. The specimen from which the illustration was prepared was secured by exchange with the Royal Gardens, Kew, England, in 1902, and has flowered repeatedly in the collections of the New York Botanical Garden.

GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1.—Flowering stem. Fig. 2.—Ray-flower, × 3. Fig. 3.—Disc-flower, × 5.

MAGNOLIA KOBUS

(Plate 108)

MAGNOLIA KOBUS

Thurber's Magnolia

Native of Japan

Family MAGNOLIACEAE MAGNOLIA Family

Magnolia Kobus D. C. Syst. **1**: 456. 1818.

A tree with a narrow pyramidal outline, said to attain in a wild state a height of eighty feet, but in cultivation of much lower stature and flowering when only twelve or fifteen feet tall. The branchlets are slender and glabrous. The alternate leaves are glabrous, with the exception sometimes of yellowish hairs on the bases of the petioles, which rarely exceed a half inch in length. The blades, measuring up to six inches long, but commonly under four, and usually under two inches broad, are obovate-cuneate, chartaceous, with the venation conspicuous, and the margins entire; the apex is obtuse or abruptly acuminate, and they are narrowed from the middle into a short petiole. The bud-scales are clothed with long yellowish appressed hairs. The flowers, which appear normally before the leaves, terminate the branches, are white, sometimes flushed with rose at the centre, and have a diameter of four or five inches. The sepals are green, narrow, and do not exceed half the length of the thin petals, which are oblanceolate, obtuse, and two to two and a half inches long. The stamens are yellow, much shorter than the petals. The fruit is two inches or more long, unsymmetric, usually curved. The seeds are orange.

This magnolia, while not as showy as some of the others, is valuable for its symmetric habit of growth and its great hardiness. Its flowers appear before the leaves, late in April or early May, rarely at a later date. While not borne as profusely as in some of the other species, their white color makes them attractive and conspicuous. The fruit is usually mature about September, the orange seeds adding an attraction. The specimen from which the illustration was prepared has been in the collections of the New York Botanical Garden for about fifteen years.

This species is quite common in the forests of Japan, was introduced into the United States by Thomas Hogg, and distributed from the Parsons' Nurseries as *Magnolia Thurberi*, under which name it is still sometimes referred to in horticultural literature.

The genus *Magnolia* is widely distributed in the northern hemisphere, being found in eastern North America, including the West

Indies, in Mexico, and in the Himalayas and eastern Asia; it contains about thirty-five species. Some of the species are evergreen, but the greater part are deciduous. In some the flowers appear before the leaves, while in others the blossoms come with or after the foliage. It is interesting to note that the species under cultivation, in which the flowers appear before the leaves, are of Asiatic origin. Seven species are found in the United States, all in the eastern part. Of these, one, *Magnolia grandiflora*, has evergreen foliage, and in another, *Magnolia virginiana*, the foliage is evergreen in the south and deciduous in the north; the remainder of the species have deciduous leaves.

GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1.—Flowering branch. Fig. 2.—Fruiting branch.

CRASSULA PORTULACEA

(Plate 109)

CRASSULA PORTULACEA

Tree Crassula

Native of south Africa

Family CRASSULACEAE STONECROP Family

Crassula portulacea Lam. Encyc. **2**: 172. 1786.

A succulent intricately branched shrub, or sometimes a dwarf tree with a well-defined trunk, up to six feet or more tall. The bark on the old stems is grayish-brown, marked with rings and irregularly shaped figures; the ultimate divisions are yellowish-brown. The sessile opposite fleshy leaves are a rather dark green, at and near the margins marked with dull reddish-brown, and are decussately arranged in two to six pairs at the branchlet-ends; they are obovate, usually more or less inequilateral, obtuse, up to two inches long and one and a quarter inches wide. The flowering stems are pink, arising from the summit of the branchlets, and bear trichotomous cymes of pale rose flowers, the color deepest toward the tips of the petals. The flowers are a half to three quarters of an inch broad, the parts usually in fives; the sepals are very short; the petals are oblong-lanceolate, acute, spreading; the stamens are alternate with and shorter than the petals, with deep rose anthers; the pistils are ascending, white flushed with rose, shorter than the stamens.

Like all south African plants, this is not hardy in the latitude of New York City, requiring in the winter time the protection of a cool house, where it may be grown with cacti and other succulent plants requiring rather cool night temperatures. Complaints have been received at the New York Botanical Garden that the plant never flowers. This is true of small specimens, but when the plant becomes large and mature it is one of the freest of bloomers, and the large specimen in the collections of the Garden, from which the illustration was prepared, is an attractive object when in full bloom, which occurs usually in January or February.

In its home it grows usually on hillsides among other shrubs. Its roots are eaten by the Hottentots under the name "T'Karchay."

The genus *Crassula* contains about two hundred species, mainly inhabitants of the Cape of Good Hope, with a few in tropical Africa, Australia, Madagascar, and China.

GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1.—Flowering stem. Fig. 2.—Flower, cut open, × 2.

VIBURNUM PRUNIFOLIUM

(Plate 110)

VIBURNUM PRUNIFOLIUM

Black Haw

Family CAPRIFOLIACEAE. HONEYSUCKLE Family

Native of the eastern and central United States

Viburnum prunifolium L. Sp. Pl. 268. 1753.

A densely branched large shrub or small tree, occasionally reaching a height of thirty feet and a trunk diameter of one foot. The young bark is smoothish and of a purple-brown color, but that of the older trunks becomes blackish, much fissured and somewhat scaly; internally, it is rusty brown and the inner surface is roughish with small oblique bast bundles. That of the root is wholly brown and is soft-scaly on the outer surface. It is bitter and of a peculiar strong odor, slightly resembling that of valerian. The wood is hard, tough and strong. The branches, like the leaves, are opposite and, when young, are apt to be thornlike. The leaves, borne on short, slender, reddish petioles, and one to three inches long, are approximately oval in form, with a rounded or slightly produced base and an obtuse, or occasionally very slightly pointed summit; the margin is very finely toothed and the venation is reddish. The white flowers are borne in nearly flat compound cymes, two to four and a half inches broad, on very short stems, the flowers also on short stems; in furit, the branches of the cyme elongate considerably. The corolla is wheel-shaped, about one third of an inch broad and deeply 5-lobed, and bears a stamen of about its own length in each sinus. The fruits are about one third of an inch long and about two thirds as broad, oval and compressed, and are tipped with the remains of the calyx. When ripe, they are black, with a thin coating of whitish wax, giving them a bluish-black appearance; each contains a single flat stone, slightly convex on one side.

The black haw is one of the most ornamental of our wild shrubs, blooming in May, when it beautifies the fence rows and hedges and the borders of woodlands with its profuse masses of snowy-white flowers. It is not infrequently planted for ornament. The fruits ripen in the late fall, when they are much eaten by children. They are agreeably sweet after being acted upon by frost, although always rather dry. Under primitive conditions, they were a favorite fruit of bears. The bark, especially that of the root, is a much-used medicine, prized by practical physicians for its anti-spasmodic properties. It has long been official in the United States Pharmacopoeia.

H. H. RUSBY.

EXPLANATION OF PLATE. Fig. 1.—Fruiting branch. Fig. 2.—Flowering branch.

CONTENTS OF VOLUME 1

CONTENTS OF VOLUME 2

CONTENTS OF VOLUME 3

CONTENTS

ADDISONIA

COLORED ILLUSTRATIONS
AND
POPULAR DESCRIPTIONS
OF
PLANTS

VOLUME 3 NUMBER 4

DECEMBER, 1918

PUBLISHED BY
THE NEW YORK BOTANICAL GARDEN
(ADDISON BROWN FUND)
DECEMBER 30, 1918

ANNOUNCEMENT

A bequest made to the New York Botanical Garden by its late President, Judge Addison Brown, established the

ADDISON BROWN FUND

"the income and accumulations from which shall be applied to the founding and publication, as soon as practicable, and to the maintenance (aided by subscriptions therefor), of a high-class magazine bearing my name, devoted exclusively to the illustration by colored plates of the plants of the United States and its territorial possessions, and of other plants flowering in said Garden or its conservatories; with suitable descriptions in popular language, and any desirable notes and synonomy, and a brief statement of the known properties and uses of the plants illustrated."

The preparation and publication of the work have been referred to Dr. John H. Barnhart, Bibliographer, and Mr. George V. Nash, Head Gardener.

ADDISONIA is published as a quarterly magazine, in March, June, September, and December. Each part consists of ten colored plates with accompanying letterpress. The subscription price is $10 annually, four parts constituting a volume. The parts will not be sold separately.

Address:

THE NEW YORK BOTANICAL GARDEN
BRONX PARK
NEW YORK CITY

Subscribers are advised to bind each volume of ADDISONIA as completed, in order to avoid possible loss or misplacement of the parts; nearly the whole remainder of the edition of Volumes 1 and 2 has been made up into complete volumes, and but few separate parts can be supplied. *New subscriptions will be accepted only as including the first volumes.*

SYMPHORICARPOS SYMPHORICARPOS

(Plate 111)

SYMPHORICARPOS SYMPHORICARPOS

Coral-berry

Native of east-central United States

Family CAPRIFOLIACEAE HONEYSUCKLE Family

Lonicera Symphoricarpos L. Sp. Pl. 175. 1753.
Symphoricarpos orbiculatus Moench, Meth. 503. 1794.
Symphoricarpos vulgaris Michx. Fl. Bor. Am. 1: 106. 1803.
Symphoricarpos Symphoricarpos MacM. Bull. Torrey Club 19: 15. 1892.

A shrub, two to five feet tall, with many erect or ascending purplish-gray or gray branches, spreading or somewhat drooping pubescent branchlets, and yellow and rose flowers followed by coral-red fruit. The opposite leaves, softly pubescent beneath, have petioles less than a quarter of an inch long; the blades are oval, varying to ovate or nearly orbicular, acute or obtuse at apex, usually about one to one and a half inches long and one half to one inch wide, and are pale beneath. The flowers, less than an eighth of an inch long, are in many-flowered densely crowded axillary spikes, which are borne upon the young growth of the season; the calyx has five triangular ciliate lobes, which in the bud lie as rudimentary structures about the base of the corolla and persist as vestiges on the apex of the fruit. The corolla is bell-shaped, turned obliquely upward, and somewhat inflated in the lower side; its tube is yellow, suffused distally with rose, and the triangular lobes are yellow. There are five pubescent stamens, which are shorter than the corolla, as is also the pubescent style. The fruit is pome-like, of a delicate coral-red, with an obscure bloom, and often an obscure purplish cast.

Those who have tramped through the open forests of the Mississippi valley know well the coral-berry, or buck-brush as it is more commonly called. Through much of the year only a weed-like over-abundant element of the underbrush, in the autumn it becomes transformed. Each branchlet, bending beneath its weight of fruit, changes to a wand of delicate red, and as the plant bears many branches, which rebranch in spray-like fashion, the whole forms a complex and a profusion of color, making it deservedly one of America's favorite decorative shrubs.

Since the leaves are opposite, the inflorescences are opposite, and because they occur in the axils of most leaves of a season's growth, and the plant is a rapid grower, the pairs of inflorescences are many and gradually approximate toward the apex of the stem. Only when young can the real structure of these be seen; in age

the maturing fruits, crowded upon the shortened axis, press one another, and even those of the opposite spikes, into irregular stellate clusters. In the late autumn a few leaves still stand out stiffly, but through the winter, until they have shriveled and blackened, or the birds have eaten the fruits, there is no veil to the showiness of the shrub.

The coral-berry prefers normal loam or clayey grove-like woodland, frequently on the thin soil of rocky places. It occurs as a native plant from western New York to South Dakota, Georgia, and Texas, only southward crossing the Alleghanies into the Piedmont flora of the Atlantic slope. It has long been cultivated and in many of the older settlements is a chance escape.

Like the closely allied snowberry, figured on plate 94, and as might be presumed from its abundance in a wild state, this species is of the easiest culture. Like that, it forms suckers, and the mode of its propagation is the same.

The specimen here illustrated was obtained from plants long grown in the New York Botanical Garden.

FRANCIS W. PENNELL.

EXPLANATION OF PLATE. Fig. 1.—Fruiting branch. Fig. 2.—Flowering branch. Fig. 3.—Flower, × 5.

SPIRAEA THUNBERGII

(Plate 112)

SPIRAEA THUNBERGII

Thunberg's Spiraea

Native of Japan and China

Family ROSACEAE — ROSE Family

Spiraea crenata Thunb. Fl. Jap. 210. 1784. Not *Spiraea crenata* L. 1753.
Spiraea Thunbergii Siebold; Blume, Bijdr. 1115. 1826.

With its spreading arched branches, this is one of the most graceful of shrubs, attaining a height of five or six feet and an equal width, the white flowers borne in great profusion. The bark of the old branches is a deep chestnut-brown, while the branches of the year are clothed with a paler bark, and are pubescent. The glabrous leaves are numerous, alternate, and appear for the most part after the flowers; they are linear-lanceolate, up to an inch and a half long and three sixteenths of an inch wide, sessile or nearly so, and are gradually narrowed from the middle to each end; the margin is serrate, except at the base, with rather distant sharp teeth. The flowers, appearing for the most part in advance of the leaves, are about a third of an inch across, are on slender glabrous pedicels a quarter to three eighths of an inch long, and occur in sessile clusters of two to five on the branches of the previous year, each cluster subtended by several bracts. The calyx is glabrous, its five lobes deltoid. The petals, equal in number to the lobes of the calyx and alternate with them, are pure white, obovate, and much exceed the stamens. The pistils are five, distinct, glabrous, and develop into follicles which open on the inner side.

In late April or the fore part of May, in the latitude of New York City, this delightful little Japanese shrub is clothed with a mantle of white blossoms, the spreading arched branches giving it a dainty grace possessed by few other shrubs. The bright green foliage of summer passes to orange or scarlet in the fall, making of it also an attractive object at that season. It is of the easiest culture, thriving in almost any soil of reasonable quality, but preferring conditions slightly moist rather than dry. As an individual specimen on the lawn it is of striking appearance, or it is effective in the border where feathery masses of white are desired. It is the first spiraea, as well as one of the earliest shrubs, to bloom, and this adds much to its value and attractiveness. It may readily be propagated from seeds or by green-wood cuttings under glass. The plant from which the illustration was prepared, has been in the New York Botanical Garden for many years.

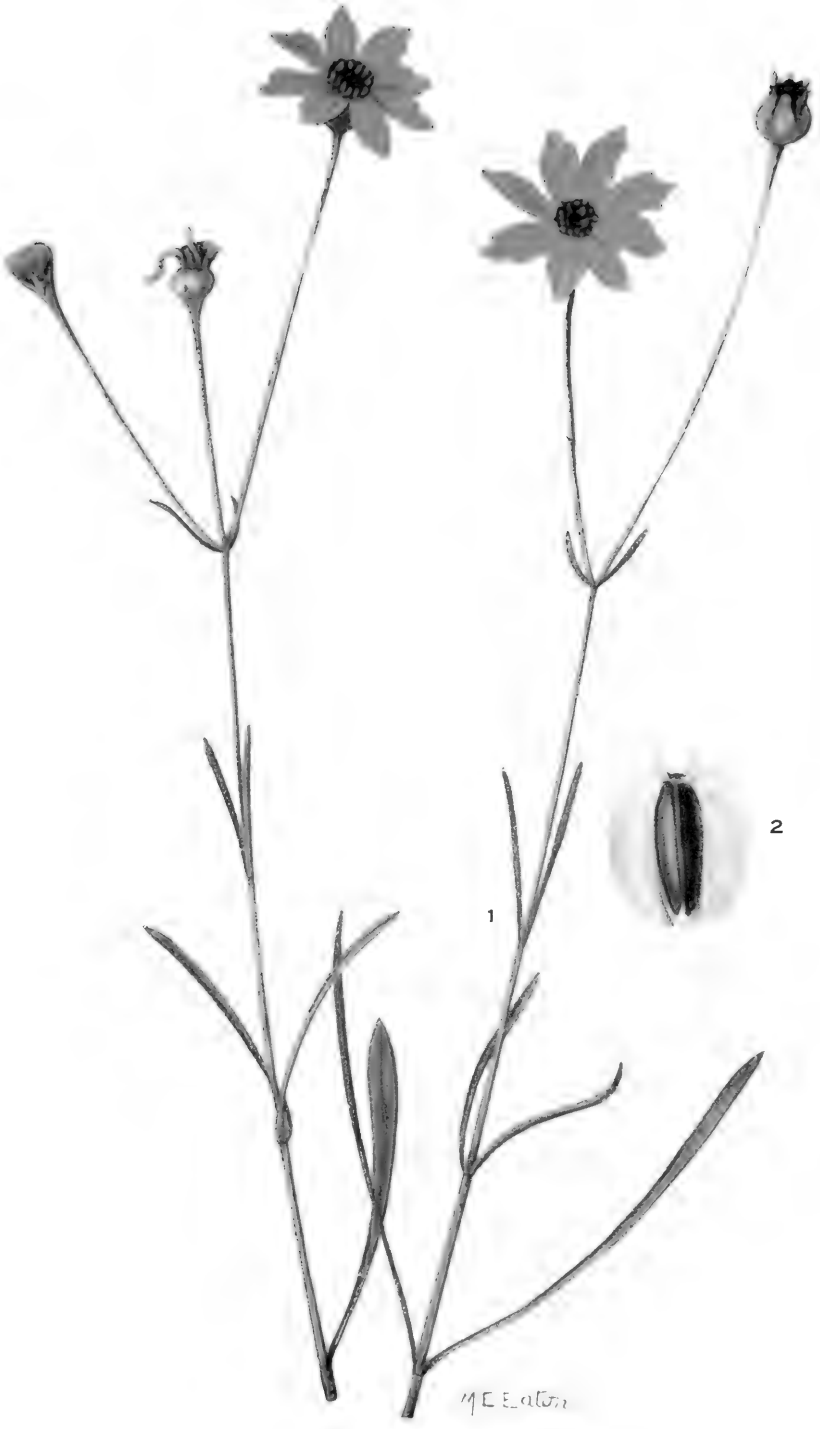
Thunberg in his Flora Japonica erroneously associated this with

the *Spiraea crenata* of Linnaeus, another and quite different plant occurring from southeastern Europe to the Caucasus. This error was detected later, and the name given to it commemorating its discoverer, Thunberg.

The genus *Spiraea* has over seventy-five species, mainly distributed in the temperate regions of the northern hemisphere, extending in the New World as far south as Mexico, and in Asia to the Himalayas. Many species are of great horticultural value, and may be classed in two groups: those which, like the present species, flower in the spring and early summer, and have white flowers borne in umbels on the wood of the previous year; and those which bear either white or pink blossoms, from early summer to fall, in corymbs or panicles on vigorous shoots of the season. It is evident, therefore, that pruning in the species of the first group should be confined to thinning, or to removing the weak wood, as otherwise the number of blossoms would be greatly reduced; while in the second group pruning may be done more vigorously, the flowers coming on the shoots of the year.

GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1.—Flowering branch. Fig. 2.—Flower, × 4. Fig. 3.—Leaves.



COREOPSIS LEAVENWORTHII

(Plate 113)

COREOPSIS LEAVENWORTHII

Leavenworth's Tickseed

Native of peninsular Florida

Family CARDUACEAE THISTLE Family

Coreopsis Leavenworthii T. & G. Fl. N. Am. **2**: 346. 1842.

An annual plant, five feet tall or less, bright green, often with a short-jointed caudex at the base. The stems are relatively slender, simple or sparingly branched and erect, or much branched near the base and more or less diffuse; the branches are glabrous, terete or longitudinally ridged when dry, and usually branched throughout. The leaves are opposite, glabrous, the lower ones with linear or narrowly spatulate blades, which are entire, or deeply pinnatifid with one to three pairs of narrow lateral lobes; the upper leaves have entire blades narrower than those of the lower ones. The bracts subtending the peduncles in the inflorescence are filiform or nearly so. The showy heads are slender-peduncled and erect. The involucre is double, hemispheric in anthesis, and persistent. The outer bracts are lanceolate-subulate to lanceolate or ovate-lanceolate, a twelfth of an inch long or less; the inner bracts are ovate, obtuse, thrice as long as the outer ones or more, somewhat fleshy, and glabrous. The copiously pitted receptacle is convex or sometimes nearly hemispheric, bearing narrowly linear bractlets. The disk is dark-brown or nearly black, about a quarter of an inch wide or less. The disk-corollas are numerous, narrowly funnelform, and less than one sixth of an inch long, with broadly ovate lobes. The stamens are slightly exserted, with ovate tips, the anthers longer than the free portion of the filaments. The ray is composed of about 8 flowers; the ligules are bright yellow, spreading, with blades varying from ovate to cuneate, about a half inch long, and obtusely three-lobed at the apex. The pappus is two upwardly barbed subulate awns. The achenes are roundish in outline, less than one sixth of an inch long, over all, the body ellipsoid, black, minutely punctate-cancellate, and usually sparingly granular-dotted. The wings are thin and translucent, each about as wide as the diameter of the achene-body, very finely laterally striate, extending above the top of the achene-body; in the sinus thus formed the two pappus-awns, in length about equal to the diameter of the achene-body, arise.

The genus *Coreopsis*, well known to plant lovers through several species almost universally cultivated in gardens, is represented by not less than twenty-four native ones in the southern states east of the Mississippi River. As many as fourteen species grow naturally in Florida. Some of these found their way to Linnaeus before

the middle of the eighteenth century, while some were not discovered until the beginning of the present century.

The species here illustrated came to notice during a period between these extremes, at a time when the plant treasures of Florida began to be discovered in increasing numbers.

It was during the Seminole War that Dr. M. C. Leavenworth, a surgeon in the United States Army and an amateur botanist, collected specimens of various plants met with in his travels and sent them to Dr. John Torrey. The original specimens from which *Coreopsis Leavenworthii* was described came from the vicinity of Tampa Bay and near Fort Drane in what is now Marion County, Florida.

Curiously enough this plant named for Dr. Leavenworth has nearly the same geographic range as *Heliotropium Leavenworthii*. It, however, extends a little further north in the peninsula and is found on some of the lower Florida Keys. Like the heliotrope just referred to, it is a prominent element in the flora of the low pinelands and marshes, and in many localities covers large areas to the exclusion of all other conspicuous vegetation, the countless myriads of heads thus forming stretches of brilliant yellow sometimes extending as far as the eye can see.

The specimens from which the accompanying illustration was made were collected by the writer in the Everglades near Cutler, Florida, May 22, 1918.

JOHN K. SMALL.

EXPLANATION OF PLATE. Fig. 1.—Flowering stem. Fig. 2.—Fruit, × 7.

ECHINACEA PURPUREA

(Plate 114)

ECHINACEA PURPUREA

Purple Cone-flower

Native of central and south-central United States

Family CARDUACEAE THISTLE Family

Rudbeckia purpurea L. Sp. Pl. 907. 1753.
Echinacea purpurea Moench, Meth. 591. 1794.
Brauneria purpurea Britton, Mem. Torrey Club **5**: 334. 1894.

A stout, erect, perennial herb, three to five feet high. The stem is either smooth or rough, and frequently tinged with red; it may be unbranched, bearing a single flower-head at its summit, but in favorable situations branches appear from the axils of the upper leaves, producing a bushy plant with a spread of two feet. The leaves are alternate, with petioles one to three inches long, the blades triangular-ovate and rather firm in texture. While the largest leaf-blades are four to six inches long by half as wide, the upper are gradually reduced in size, are narrower in relative width, and have shorter petioles; they are rough on both sides, three-nerved, sharply and irregularly serrate at the margin, sharply acuminate at the apex, and rather abruptly narrowed into an obtuse or broadly acute base. The upper portion of the main stem, six to ten inches in length, and of each of its branches, is leafless, becomes gradually thicker toward the summit, and terminates in a flower-head. Each head is subtended by a saucer-shaped or depressed-hemispheric involucre composed of a number of lanceolate scales. The disk is an inch or more in diameter, purple-brown, and hemispheric or conic. The disk-flowers are almost concealed among the long sharp-pointed projecting scales of the receptacle. The ray-flowers are twelve to twenty in number, red-purple, two to two and one half inches long, and conspicuously drooping. The ray-flowers are neutral, and fall after flowering, while each disk-flower ripens a thick four-sided achene with a short crown-like pappus.

The purple cone-flower is distinctly a woodland species and is widely distributed through the forested region of the central states from Pennsylvania to Michigan, Georgia, and Louisiana. West of this region, it is replaced by *Echinacea pallida* in the prairie region, and by *Echinacea angustifolia* on the plains; *Echinacea tennesseensis* occurs in Tennessee and Arkansas. These three agree with *Echinacea purpurea* in their red-purple flowers, while the fifth species of the genus, *Echinacea paradoxa* of southwestern Missouri, has yellow rays.

Of the four species with red-purple flowers, *Echinacea purpurea* is by far the most attractive in its native haunts and most worthy

of cultivation. It appears to best advantage at the edge of the forest, where it receives plenty of sun and still enjoys the protection of the trees. Here it grows tall, branches freely, and produces a correspondingly larger number of its showy heads. Its coarse foliage and stiff heads make it poorly adapted for the small garden, but it can be used to advantage against a background of shrubbery in large plantings. In the latitude of New York the flowers appear in July and August.

Specimens of this plant are growing in the collections of the New York Botanical Garden, and it was from one of these that our illustration was drawn.

H. A. GLEASON.

EXPLANATION OF PLATE. Fig. 1.—Flowering stem. Fig. 2.—Lower leaf. Fig. 3.—Disk-flower and scale, side view, × 3. Fig. 4.—Disk-flower, × 3.

LANTANA DEPRESSA

(Plate 115)

LANTANA DEPRESSA

Pineland Lantana

Native of southern Florida

Family VERBENACEAE VERVAIN Family

Lantana depressa Small, Bull. N. Y. Bot. Gard. 3: 436. 1905.

A shrub, with numerous diffuse or prostrate branches three feet long or less, from a stout woody root. The branches are somewhat angled, finely, often sparingly, pubescent, and unarmed. The leaves are opposite, usually numerous, bright green, mostly one to two inches long; the blades are ovate to elliptic, acute or obtuse, serrate to crenate-serrate, sparingly fine-pubescent on both sides, more or less shining and with impressed veins above, dull and with prominent veins beneath, and tapering, cuneate, or rounded at the base. The flowers are borne in bracted involucrate clusters about an inch in diameter, terminating minutely hairy peduncles which usually exceed their subtending leaves. The bracts are lanceolate to linear-lanceolate, minutely pubescent, and imbricate on the ovoid or ellipsoid receptacle-like rachis. The calyx is campanulate, about a twelfth of an inch long, two-lobed, usually about one half as long as the subtending bract, minutely pubescent and ciliolate. The corolla is deep yellow or bright orange, a half inch long or less, with the finely pubescent tube slightly dilated upward and often a little curved. The limb is oblique, with a reniform upper lip and a three-lobed lower lip, which has a broad, often reniform, middle lobe about twice as large as the lateral lobes. The four stamens are minute, borne in pairs about the middle of the corolla, the posterior pair further down on the corolla-tube than the anterior. The anthers are subglobose and more or less didymous, nearly or quite as long as the free part of the filament. The ovary is ovoid or ellipsoid, sessile, and tipped with a slender columnar style which exceeds the ovary in length. The stigma is very oblique. The drupes are clustered, subglobose, black or purple-black, shining, about one sixth of an inch in diameter, and tardily deciduous from the thickened receptacle-like rachis.

One of the more conspicuous shrubs of the Everglade Keys at nearly all seasons of the year is the plant here illustrated.

The genus *Lantana* contains about fifty species. They are most abundant in tropical and subtropical America; there are a few in Africa and Asia. The plants range in habit from erect shrubs to those with creeping stems; some are even vine-like. The flowers range from white to various shades of several colors. Sometimes several colors are represented on one plant.

The species here illustrated seems not to have been observed until 1903. It has a stout, frequently knob-like root, which is often seated in or nearly enclosed in a cavity of the honeycombed limestone on which the plant grows. From this root dozens of stems spring and spread radially on the ground. Single plants thus form mats on the rocky pineland floor, varying from two to six feet in diameter. When covered with myriads of golden-yellow flowers, as they are nearly if not quite throughout the year, these mats form the most conspicuous floral element of the woods. On account of the showy flowers this plant is sometimes grown in neighboring gardens as an ornament.

Unlike the several naturalized species of *Lantana* in Florida, the flowers of this do not vary in color, either on the same individual or on different ones.

The specimen from which the accompanying illustration was made was collected on the reservation of Charles Deering at Cutler, Florida, May 5, 1918.

JOHN K. SMALL.

EXPLANATION OF PLATE. Fig. 1.—Flowering stem. Fig. 2.—Flower, × 2. Fig. 3.—Flower, cut open, × 2. Fig. 4.—Stamens, × 6. Fig. 5.—Fruit.

ILEX VERTICILLATA

(Plate 116)

ILEX VERTICILLATA

Winterberry

Native of eastern United States

Family AQUIFOLIACEAE HOLLY Family

Prinos verticillatus L. Sp. Pl. 330. 1753.
Ilex verticillata A. Gray, Man. ed. 2. 264. 1856.

An openly branched shrub, not commonly over eight to ten feet high but, it is said, exceptionally growing to the stature of a small tree; the branching is alternate, the twigs dark brown flecked with scattered white lenticels, their younger parts often slightly pubescent. The dark green leaves are reticulate-veiny and often rugose, and are thicker but less firm than in other nearly related species; they are glabrous or somewhat pubescent on the upper surface and more or less tomentulose-pubescent beneath, especially along the prominent veins; their shape varies from lance-oval or broader to oblong-lanceolate, with acute or caudate-acuminate apex and narrowed or contracted base; the margins are somewhat doubly and unevenly sub-uncinately serrate; the blades are one and one half to three and one half inches long and half as broad as long; the petioles usually bear some pubescence and are one quarter to three quarters of an inch long. The flowers are mainly dioecious and are crowded in diminutive axillary cymes along the season's branches. The sterile flowers are in number one to twelve and are borne on usually glabrous pedicels three sixteenths of an inch or less in length, their peduncle usually shorter and puberulent; the fertile flowers are one to three on commonly puberulent pedicels shorter and less slender than those of the sterile flowers, their peduncle almost obsolete; minute brown bracteoles are found at the base of the pedicels. The small calyx-lobes are ovate to triangular-ovate or orbicular and are pubescent and fringed. The white corolla is rotate, about one quarter of an inch across, with four to six oblong blunt lobes spreading and somewhat recurved at maturity. The drupes are scarlet and shining and are globose, or slightly broader than long, becoming three eighths of an inch in diameter; their pulp is yellow and incloses about six oblong, three-angled, bony nutlets one quarter to three sixteenths of an inch in length.

Not in any way noteworthy in form or foliage and without distinction in its flowering, this shrub has little to mark it for particular attention until, in the autumn, its scarlet berry-like drupes brighten in the low grounds and thickets that are its home. By mid-September the berries, for, non-botanically, such are they

to the eye, take their first tinge of color and soon thereafter gleam among the green leaves like polished coral beads singly or clustered in the short intervals along the branches between leaf and leaf. The leaves themselves at no time show any bright tints of autumn coloring. Nor do they persist late in the season but, falling away, leave the fruit in beaded wands to glow in frozen swamp and gray thicket well into the winter, the name "winterberry" needing no interpreter. Of less obvious application, the name "black alder" is said to have reference to the dark color of the older bark.

This is a shrub of friendly habit with other low-ground woody species of like stature and is not disposed to take so close a growth as to preclude a mixed association with its companions. Among them its flowers make no display and have only a brief season in late June and early July.

The distribution of this species is from Connecticut to Florida and northward in the interior from Missouri to Wisconsin and Ontario. Eastward and northward it gives place to another winterberry, *Ilex bronxensis*, not widely dissimilar in aspect but of distinct attributes. A derivative of this, the Nantucket winterberry, *Ilex fastigiata*, having smaller and narrower leaves and crowded erect branches, is abundant on Nantucket, and is almost insular in its habitat, occurring elsewhere, as far as known, only locally in New Jersey.

Our plate is from a shrub growing in the Fruticetum of the New York Botanical Garden, transplanted from the North Meadow in 1898. The species is in cultivation, but deserves a wider use in planted grounds. White-fruited and yellow-fruited forms have been reported.

E. P. BICKNELL.

EXPLANATION OF PLATE. Fig. 1.—Fruiting branch. Fig. 2.—Flowering branch. Fig. 3.—Flower, × 5.

VIORNA BALDWINII

(Plate 117)

VIORNA BALDWINII

Pine-hyacinth

Native of peninsular Florida

Family RANUNCULACEAE CROWFOOT Family

Clematis Baldwinii T. & G. Fl. N. Am. **1**: 8. 1838.
Viorna Baldwinii Small, Fl. SE. U. S. 439. 1903.

A perennial with a cluster of tough-succulent cord-like roots at the base of a hard simple or branched caudex. The stems are solitary or several together, angled or ultimately channeled, finely pubescent, at least when young, sparingly leafy, and simple or in the case of robust plants sometimes somewhat branched. The leaves are opposite, in few pairs, distant or sometimes approximate on the branches. The blades are various, either entire throughout the plant or entire on the lower part of the stem and lobed above; those of the lower leaves relatively shorter and broader than those of the upper, ovate, oval, elliptic, or lanceolate, half an inch to two inches long, obtuse or mucronate; those of the upper ones lanceolate, elliptic-lanceolate, or linear, or palmately or pinnately lobed and with narrow divisions; all of them more or less pubescent beneath, at least when young, or sometimes glabrous, sparingly veined with the veins united in intramarginal loops, and sessile or with short margined petioles. The pedicels or flower-stalks are elongate, erect, similar to the stem but more slender and more pubescent, usually copiously pubescent below the flower, the hairs white or whitish, short, crisped. The flower is solitary at the end of each pedicel, nodding. The calyx is campanulate, about an inch long, deep lavender and shining without, pale-lavender or whitish within, more or less swollen at the base; the sepals are sometimes faintly lined, with the spreading or recurved margins thin and crisped, often sparingly pubescent without, tomentulose within in a line along the margins. The corolla is wanting. The stamens are numerous, erect, borne on a receptacle just within the whorl of sepals; the filaments are filiform, but slightly flattened, sparingly villous except near the base; the anthers are linear, glabrous, decidedly shorter than the filaments, abruptly and minutely tipped at the apex. The carpels are numerous, crowded on a hemispheric receptacle, elongate; the ovary is ovoid and densely clothed with long sliky appressed hairs; the style is filiform, densely clothed with and hidden in the long silky hairs which are loosely appressed on the lower part and closely appressed on the upper. The stigma is introrse, slightly recurved at the apex. The achenes are borne in an erect plume-like head; their bodies are ovoid, fully one sixth of an inch wide, loosely appressed-pubescent, brown, each terminat-

ing in the slenderly elongated style which is conspicuously plumose by lax sordid hairs.

The clematis-relative here described and figured represents one of the more interesting plants discovered during a period of exploration in Florida subsequent to that represented by the Bartrams. It was apparently first detected by William Baldwin, a surgeon in the United States Navy, about the end of the first decade of the last century, perhaps shortly before he was recalled to active service in the war of 1812 with Great Britain. It seems strange that Bartram did not observe this plant or at least mention it in his "Travels" if he had met with it in the field, and it is still stranger that Baldwin, who did collect it, did not refer to it in his published letters,* for, if it is not a conspicuous plant with a showy flower, it is at least attractive, and unique in the flora of Florida.

Either in flower or in fruit this plant attracts the eye. In flower the nodding bell-shaped bright flowers are different from those of any of the associated plants. The calyx resembles a large hyacinth flower, whence, in connection with the plant's habitat, namely the pinewoods, the popular name, pine-hyacinth. In fruit it attracts attention by the plumes made up of the numerous long curled hairy tails of the achenes.

By means of a stout caudex and numerous tough roots the pine-hyacinth is able to survive repeated forest fires. These, occurring frequently, sometimes almost annually, apparently rather stimulate the plant which, burned off at the surface of the ground, quickly starts afresh and sends up new flowering stems with decided vigor. The forest fires, occurring at different seasons in both neighboring and distant regions, thus prolong the flowering season of the pine-hyacinth throughout the year. Individuals planted or growing naturally in some protected area only, would give the clue to the normal flowering season of this species.

The specimens from which the accompanying plate was made were collected by the writer in pinelands bordering the Everglades along the Tamiami Trail several miles west of Miami, Florida, in May, 1918.

JOHN K. SMALL.

EXPLANATION OF PLATE. Fig. 1.—Flowering stem. Fig. 2.—Fruit.

*Reliquiae Baldwinianae.

JUSSIAEA PERUVIANA

(Plate 118)

JUSSIAEA PERUVIANA

Marsh Evening-primrose

Native from peninsular Florida to South America

Family ONAGRACEAE EVENING-PRIMROSE Family

Jussiaea peruviana L. Sp. Pl. 388. 1753.

A perennial plant, partly woody, the stems fourteen feet tall or less, widely branched, hirsute, with a reddish or brown bark which comes off as shreds on the stems and older branches. The leaves are alternate, numerous, and deep-green. The blades are thick-herbaceous, ovate, oval, elliptic, lanceolate, or elliptic-lanceolate, mostly two to four inches long, or longer, acute or somewhat acuminate, or sometimes obtuse, more or less acuminate at the base, short-petioled or those near the ends of the branches sessile or nearly so, more or less pubescent, sometimes sparingly, at other times quite copiously, but always with fewer hairs above than beneath; they are entire, and with numerous upwardly curved lateral veins which are particularly prominent beneath and unite to form an intramarginal vein. The flowers are solitary at the ends of short, naked, axillary branches, subtended by a pair of bracts which are usually deciduous in anthesis or soon after. The bracts are narrowly elliptic to elliptic-lanceolate, and acuminate. The hypanthium is turbinate in anthesis and closely fine-pubescent. The four persistent sepals are lanceolate or ovate-lanceolate, one third to two thirds of an inch long, acuminate, ciliate, pubescent with short and long hairs without and glabrous within. The corolla is bright yellow, showy, two to two and a half inches wide. The four petals are very broad, the blades varying from suborbicular to orbicular-reniform, more or less notched at the apex, entire, short-clawed, pinnately veined. The stamens are usually eight in number, borne on the edge of the hypanthium and surrounding a stylopodium. The filaments are subulate, alternately shorter and slender and longer and stout. The anthers are narrowly ellipsoid, as long as the filaments or slightly shorter. The ovary is inferior and with the top covered by the stylopodium. The style is short and stout, urceolate, usually with a wider top than base. The stigma is ovoid and four-lobed. The capsules are oblong-pyramidal or pyramidal-obovoid, one half to three quarters of an inch long, topped with the somewhat accrescent stylopodium, crowned with the persistent sepals, 4-ribbed, the sides pubescent, more copiously so about the ribs, along which they usually rupture. The seeds are very numerous, obliquely ellipsoid, about one twenty-fourth of an inch long, yellowish, shining.

As modern civilization advanced into Florida, botanical explora-

tion was taken up, following several natural stages: first the pinelands, then the hammocks were investigated, and later the wet parts of the country, the marshes and the swamps, received some attention. The plant under consideration, an inhabitant of swamps and marshes, did not appear in botanical literature of the United States until the last quarter of the nineteenth century. It was discovered in Florida, almost simultaneously, at the western side of the peninsula and on the eastern, along the shores of two rivers which have become permanently and prominently associated with the botanical history of North America, namely the Caloosahatchie and the Miami.

In Florida *Jussiaea peruviana* is now known to range from the lake region to the southern end of the peninsula. It thrives only in alluvial soil, consequently it does not occur on the Florida Keys where alluvium is absent. Outside of Florida it has a very extensive geographic range, extending through the West Indies and continental tropical America to the southern part of South America. Throughout this wide range the plants show but slight variation in characters. This fact is noteworthy when we consider that south of Florida this species has also considerable altitudinal range, commonly occurring at five to six thousand feet elevation in mountainous regions.

This plant was discovered near Lima, Peru, about the beginning of the eighteenth century. In that region it enjoyed considerable repute among the Indians as a remedy for various diseases. Its reputed medicinal qualities do not seem to have been discovered by the Seminole Indians in Florida, although they have lived in the midst of the plant for generations.

This evening-primrose is one of our giant herbs. Although it cannot compete with the "careless" (*Acnida australis*) in the massiveness of its stem, it nearly or quite equals it in height. The numerous large flowers with their bright yellow corollas which expand during the evening, night and early morning are in strong contrast to the deep-green foliage of the plant.

The specimens from which the accompanying plate was made were collected in May, 1918, by the writer, in the Everglades near the source of the west branch of the Miami River; this stream once arose there as a rapids flowing over the rocky rim of the Everglades, at one time a picturesque landmark but totally destroyed during the past few years.

JOHN K. SMALL.

EXPLANATION OF PLATE. Fig. 1.—Flowering stem. Fig. 2.—Fruit, immature.

SALVIA FARINACEA

(Plate 119)

SALVIA FARINACEA

Gray Salvia

Native of Texas and New Mexico and adjacent Mexico

Family LAMIACEAE MINT Family

Salvia farinacea Benth. Lab. Gen. & Sp. 274. 1833.

A perennial plant two to three feet tall, with mealy blue or pale blue calyxes, and violet or purple corollas. The puberulent stems are usually branched. The leaves are opposite, but often, by the development of short leafy branches in their axils, appearing as if in clusters. The blades, commonly on slender petioles less than an inch long, vary considerably in shape, ranging from linear-lanceolate to ovate, but more frequently of the narrower types, and are up to three inches long and an inch and a quarter wide, but usually less than an inch wide; the surfaces are more or less pubescent, and the margins entire, undulate or serrate. The flowers, in racemes up to ten inches long on long naked stalks, are in rather close whorls of a dozen or more. The calyx is three sixteenths to a quarter of an inch long and tubular-bell-shaped, has prominent nerves, and is at first of a steel blue, fading paler; it is covered with a white pubescence which gives it a mealy appearance. The corolla is violet or purple, up to five eighths of an inch long, pubescent externally, two-lipped; the upper lip is hooded, erect, about half as long as the four-lobed spreading lower lip.

As a perennial plant this has not proven hardy at the New York Botanical Garden, but as a hardy annual it has been very successful. Self-sown seeds germinate freely in the spring, giving an abundance of seedlings which require vigorous thinning out. Its deep-colored corollas in contrast with the calyxes and gray foliage give it a striking appearance, and make it a valued addition to the gray border. The species has been in the collections of the New York Botanical Garden since 1915, and it is from plants from self-sown seed that the drawing has been prepared.

The genus *Salvia*, comprising over five hundred species widely distributed in temperate and tropical regions, has furnished many plants of horticultural value, there being more than fifty now in cultivation in this country. One of the commonest of these, both in the border and as a bedding plant, is the scarlet sage, *Salvia splendens*, a native of Brazil; its blazing color is conspicuous up to the time of frost. Another species, of widely different appearance, is *Salvia argentea*, the foliage densely covered with long silvery

hairs; unfortunately, however, it is a biennial. A plant of economic importance is *Salvia officinalis*, the common sage, the leaves of which are used for flavoring.

GEORGE V. NASH.

EXPLANATION OF PLATE. Fig. 1.—Flowering stem. Fig. 2.—Flower, cut open, × 2. Fig. 3.—Stamens, front view, × 2. Fig. 4.—Stamens, side view, × 2. Fig. 5.—Style, × 2.

DIANTHERA CRASSIFOLIA

(Plate 120)

DIANTHERA CRASSIFOLIA

Florida Water-willow

Native of Florida

Family ACANTHACEAE ACANTHUS Family

Dianthera crassifolia Chapm. Fl. S. U. S. 304. 1860.

A perennial plant, with horizontal, often branched, succulent, nodose rootstocks. The stems are solitary, tufted or gregarious, four to sixteen inches tall, sometimes branched at the base, succulent and glabrous. The leaves are opposite, quite various; those of the lowest pair have orbicular, oval, ovate, or obovate blades, those on the lower part of the stem, spatulate to linear-spatulate, those on the upper part of the stem, linear-lanceolate to linear, often narrowly so, or sometimes all narrowly linear above the lowest pair or two; all gradually or abruptly narrowed into short and stout petioles. The blades are entire but often wavy-margined, or sometimes obscurely toothed. The flowers are borne in long-peduncled elongate virgate spike-like panicles, each subtended by an involucre-like group of bracts. The calyx is green, usually a quarter to a half inch long, with linear acuminate lobes which stand erect or nearly so. The corolla is rose-purple, except for some paler figuring in the throat and on the lower lip, and the base of the tube, which is green or sometimes pink or nearly white; it is three quarters of an inch to one inch long, the tube very short and somewhat swollen; the limb consists of a narrow upper lip, reflexed and two-lobed at the apex, and a very broad spreading three-lobed lower lip with the middle lobe slightly notched at the apex and the somewhat narrower lateral lobes entire. The filaments and anther-connective are pale. The anther-sacs are dark brown, one twelfth to one eighth of an inch long. The ovary is conic and terminated by a filiform style, with obtuse stigmas. The capsule is about one inch long or less, with an ellipsoid body which terminates a stipe-like base of about equal length. The seeds are orbicular, flat, and about one sixth of an inch in diameter.

In the northern states many are well acquainted with the water-willow, *Dianthera americana*, which grows in often extensive patches or large areas on flat shores or about islands. The stems are often partly submerged. That plant is relatively large but its flowers are rather inconspicuous.

In the southern states there are several smaller water-willows, but their flowers, although mostly white, are much more conspicuous than those of the northern plant. However, the most showy of all is the one here illustrated. It is an inhabitant of

Florida, and is particularly abundant in the Everglade region of that state. In the Everglades and adjacent marshes it often grows in vast patches, and in the morning the bright-colored corollas are exceedingly conspicuous.

This plant was discovered in middle Florida about the middle of the last century, by A. W. Chapman, who first described it in 1860. It was recorded as growing in wet pine barrens at the original locality. Since the early collections were made it has been found to inhabit prairies, hammocks, and particularly the Everglades. Outside of the Everglades it grows in either sand or clay, but in the Everglades it often grows in almost pure decayed vegetable matter. There its rootstocks, enclosed in the wet spongy mass of humus, absorb moisture and nutriment sufficient to produce a more luxuriant growth than I have seen elsewhere. Sometimes acres are covered with a growth of this showy water-willow, almost to the exclusion of other vegetation.

The specimen from which the accompanying illustration was made was collected in the Everglades along the Tamiami Trail, April 28, 1918, by the writer.

JOHN K. SMALL.

EXPLANATION OF PLATE. Fig. 1.—Flowering stem. Fig. 2.—Flower. Fig. 3.—Flower, cut open, × 2½. Fig. 4.—Fruit.

INDEX

Bold-face type is used for the Latin names of plants illustrated; SMALL CAPITALS for Latin names of families illustrated and for the names of the authors of the text; *italics* for other Latin names, including synonyms.

FORMER PLATES

PLATE 1. RHODODENDRON CAROLINIANUM
PLATE 2. CASSIA POLYPHYLLA
PLATE 3. ROBINIA KELSEYI
PLATE 4. PACHYPHYTUM LONGIFOLIUM
PLATE 5. BEGONIA COWELLII
PLATE 6. ECHEVERIA SETOSA
PLATE 7. COLUMNEA GLORIOSA
PLATE 8. FOUQUIERIA FORMOSA
PLATE 9. MAXILLARIA RINGENS
PLATE 10. NOPALEA AUBERI
PLATE 11. CRINUM AMERICANUM
PLATE 12. CLETHRA ALNIFOLIA
PLATE 13. ECHEVERIA CARNICOLOR
PLATE 14. MINA LOBATA
PLATE 15. CLERODENDRON TRICHOTOMUM
PLATE 16. NOTYLIA SAGITTIFERA
PLATE 17. EXOGONIUM MICRODACTYLUM
PLATE 18. VITEX AGNUS-CASTUS
PLATE 19. OPUNTIA MACRORHIZA
PLATE 20. COMMELINA COMMUNIS
PLATE 21. ADOXA MOSCHATELLINA
PLATE 22. SISYRINCHIUM BERMUDIANA
PLATE 23. COLUMNEA HIRTA
PLATE 24. PEDILANTHUS SMALLII
PLATE 25. CREMNOPHILA NUTANS
PLATE 26. PITHECOLOBIUM GUADALUPENSE
PLATE 27. ANTHURIUM GRANDIFOLIUM
PLATE 28. EPIDENDRUM PALEACEUM
PLATE 29. BEGONIA WILLIAMSII
PLATE 30. ONCIDIUM UROPHYLLUM
PLATE 31A. SEDUM DIVERSIFOLIUM
PLATE 31B. SEDUM HUMIFUSUM
PLATE 32. CATASETUM SCURRA
PLATE 33. CHIONODOXA LUCILIAE GIGANTEA
PLATE 34. AGAVE SUBSIMPLEX
PLATE 35. DASYSTEPHANA PORPHYRIO
PLATE 36. RHUS HIRTA DISSECTA
PLATE 37. CYMOPHYLLUS FRASERI
PLATE 38. OPUNTIA VULGARIS
PLATE 39. TILLANDSIA SUBLAXA
PLATE 40. ECHEVERIA AUSTRALIS
PLATE 41. NOLINA TEXANA
PLATE 42. TRICHOSTERIGMA BENEDICTUM
PLATE 43. BENTHAMIA JAPONICA
PLATE 44. DIRCAEA MAGNIFICA
PLATE 45. BUDDLEIA DAVIDI
PLATE 46. GONGORA TRUNCATA ALBA
PLATE 47. WERCKLEOCEREUS GLABER
PLATE 48. DUDLEYA BRANDEGEI
PLATE 49. ABELIA GRANDIFLORA
PLATE 50. PEPEROMIA OBTUSIFOLIA
PLATE 51. SOLIDAGO JUNCEA
PLATE 52. ECHEVERIA MULTICAULIS
PLATE 53. CATASETUM VIRIDIFLAVUM
PLATE 54. SAGITTARIA LATIFOLIA
PLATE 55. BACCHARIS HALIMIFOLIA
PLATE 56. XANTHISMA TEXANUM
PLATE 57. SEDUM BOURGAEI
PLATE 58. CIMICIFUGA SIMPLEX
PLATE 59. FEIJOA SELLOWIANA
PLATE 60. ASTER AMETHYSTINUS
PLATE 61. HARRISIA GRACILIS
PLATE 62. EPIDENDRUM OBLONGATUM
PLATE 63. AESCULUS PARVIFLORA
PLATE 64. MICRAMPELIS LOBATA
PLATE 65. BOMAREA EDULIS
PLATE 66. ASTER TATARICUS
PLATE 67. PACHYPHYTUM BRACTEOSUM
PLATE 68. HARRISIA MARTINI
PLATE 69. ONCIDIUM PUBES
PLATE 70. RAPHIOLEPIS UMBELLATA
PLATE 71. ROSA "SILVER MOON"
PLATE 72. DENDROBIUM ATROVIOLACEUM
PLATE 73. CENTRADENIA FLORIBUNDA
PLATE 74. PIAROPUS AZUREUS
PLATE 75. SOLIDAGO ALTISSIMA
PLATE 76. PENTAPTERYGIUM SERPENS
PLATE 77. FREYLINIA LANCEOLATA
PLATE 78. ANNESLIA TWEEDIEI
PLATE 79. CRASSULA QUADRIFIDA
PLATE 80. ASTER CORDIFOLIUS
PLATE 81. ARONIA ATROPURPUREA
PLATE 82. ASTER NOVAE-ANGLIAE
PLATE 83A. GYMNOCALYCIUM MULTIFLORUM
PLATE 83B. GYMNOCALYCIUM MOSTII
PLATE 84. EUONYMUS ALATA
PLATE 85. DIOSPYROS VIRGINIANA
PLATE 86. LEPADENA MARGINATA
PLATE 87. MAACKIA AMURENSIS BUERGERI
PLATE 88. HIBISCUS OCULIROSEUS
PLATE 89. CORNUS OFFICINALIS
PLATE 90. OPUNTIA LASIACANTHA
PLATE 91. COTONEASTER SIMONSII
PLATE 92. ECHEVERIA NODULOSA
PLATE 93. HELIANTHUS ORGYALIS
PLATE 94. SYMPHORICARPOS ALBUS LAEVIGATUS
PLATE 95. SINNINGIA SPECIOSA
PLATE 96. STYLOPHORUM DIPHYLLUM
PLATE 97. ARONIA ARBUTIFOLIA
PLATE 98. HAMAMELIS JAPONICA
PLATE 99. HIBISCUS MOSCHEUTOS
PLATE 100. SOBRALIA SESSILIS
PLATE 101. CORNUS MAS
PLATE 102. SOLIDAGO SQUARROSA
PLATE 103. CALLICARPA JAPONICA
PLATE 104. ASTER LAEVIS
PLATE 105. OPUNTIA OPUNTIA
PLATE 106. ILEX SERRATA ARGUTIDENS
PLATE 107. OTHONNA CRASSIFOLIA
PLATE 108. MAGNOLIA KOBUS
PLATE 109. CRASSULA PORTULACEA
PLATE 110. VIBURNUM PRUNIFOLIUM

CONTENTS